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THE PREPARATION OF A BUILDING AND SPACE DATA BANK AT THE NAVAL POSTGRADUATE SCHOOL

by

Robert Judd Arnold

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THE PREPARATION OF A BUILDING AND SPACES DATA BANK AT THE NAVAL POSTGRADUATE SCHOOL

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Robert Judd Arnold

June 1969

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The Preparation of a Building and Spaces Data Bank at the Naval Postgraduate School

by

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Lieutenant, United States Navy
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Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN COMPUTER SCIENCE

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Thesis
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ABSTRACT

This document describes the design and development of a Building and Spaces Information System at the Naval Postgraduate School. The system was designed to be used by the Naval Postgraduate School facility resource managers as a decision making aid.

System analysis techniques were applied to the present facility resource decision system to determine its structure and information needs. Additional problem analysis was conducted to determine which of the needs could be incorporated into an information system. The intersection of the foregoing needs and the subsequent problem analysis determined the structure of the new system. The objective of the new system was to supply the managers with a centralized source of information with regard to existing facilities. A complete software package was designed, tested, and documented, but not implemented. An extensive user's manual is provided to expedite implementation when it occurs.

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I. INTRODUCTION

This thesis describes the preparation and recommended use of a Building and Spaces Information System (BASIS) as part of a proposed Total Integrated Management Information System at the Naval Postgraduate School (NPGS), Monterey, California. The plan for the NPGS MIS was formally presented in LT Lochridge's proposal of December 10, 1968 [Ref. 3]. The Building and Spaces Information System (BASIS) will use the NPGS IBM 360/67 computer. Computers have been used extensively in the past 15 years for the storage and retrieval of information, i.e., as a data bank [Ref. 7]. It is only recently that this data bank concept has been used by management as an aid in decision making.

A. ANALYSIS OF THE PRESENT DECISION SYSTEM

To prepare an information system that would serve as an aid to the NPGS facility resource managers it was necessary to analyze the existing decision system. An understanding of the system's organization, points of decision responsibility, and information needs had to be obtained prior to designing BASIS. This understanding was gained through research and interviews. The system is described in the following sections.

1. Organization and Responsibility

The general organization and lines of communication for facilities management at NPGS are illustrated in Figure 1 [Ref. 5].

The responsibility for the planning and allocation of facility resources at NPGS are defined and distributed as described below [Ref. 5].

a. Facilities Planning Board

The Facilities Planning Board is composed of the Deputy Superintendent for Operations and Programs, as Chairman, the Academic Dean, the Deputy Superintendent for Administration and Logistics, and the Plans Officer, as Secretary. The Public Works Officer serves as a technical advisor to the Board. The functions of the Board include:

1) Advising the Superintendent on use and development of land and facilities in support of the School's mission.

2) Reviewing the Basic Facility Requirements and advising the Superintendent on matters related to the submission of Military Construction (MILCON) Requirements.

b. Plans Officer

The Plans Officer is charged with the development of short range, long range, and operating plans of the school. He has the following well defined responsibilities in the facilities area:

1) Developing and maintaining current plans for Area Coordination and Disaster Control for the school.

2) Coordinating the development and maintenance of an integrated operation plan for approval by the

NAVAL POSTGRADUATE SCHOOL

FACILITIES RESOURCE DECISION SYSTEM

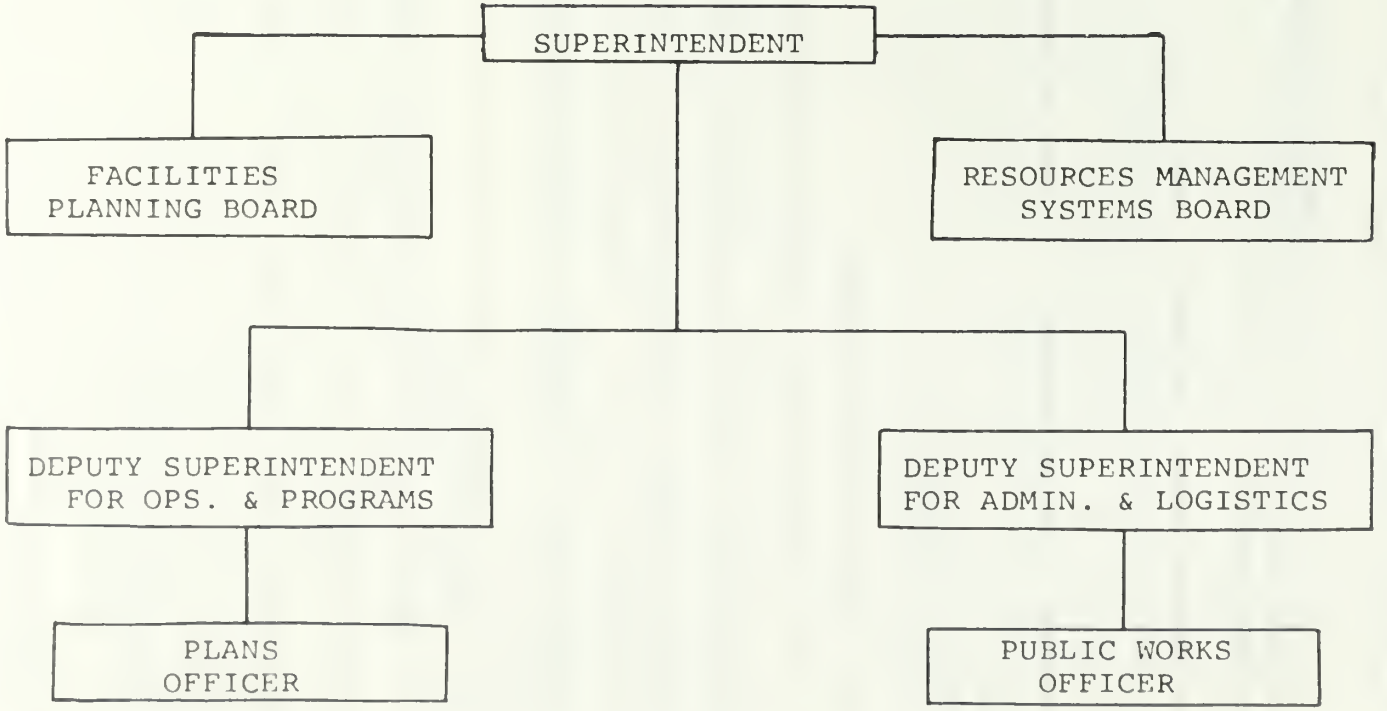

Figure 1

Superintendent. This includes broad and detailed planning required by the academic programs and academic support services related to student loads and building space allocation and utilization.

3) Coordinating the development and maintenance of a physical resources inventory, to include all structures.

4) Assistance and liaison in development and maintenance of the Master Development Plan.

5) Function as liaison between the Faculty and the Deputy Superintendents for the planning of academic buildings, facilities and support services.

6) Accomplish special projects related to any of the above functions.

c. Public Works Officer

The Public Works Officer is responsible for:

1) Maintenance of and alterations to buildings.

2) Administration and maintenance of government housing.

3) Preparation of reports concerning the two items above.

d. Class Scheduler

The Class Scheduler does not actively participate in facilities planning, but does directly influence space allocation while performing the following duties:

1) Preparing an academic schedule for each quarter.

2) Recommending changes in room usage in the interest of improving efficiency of operations.

3) Making statistical studies of teaching loads, class sizes, and room and laboratory usage.

e. Resources Management Systems Board

The Resources Management Board was established in April, 1968. Its purpose is to advise the Superintendent on all resource management matters and to aid all NPGS

managers in the utilization of their resources [Ref. 6]. Thus it will directly affect how the facility resources are managed.

2. Information Needs

With the system organization and decision responsibility points identified, interviews were conducted to gain further insight into the decision system and to determine its information needs. Interviews were conducted with the Plans Officer, Scheduler, and Public Works Department.

The interview with the Plans Officer, who serves as Secretary of the FPB, provided information on both the Board's decision making process and his own.[1] All major facility resource allocation, planning, and management decisions are made by the Facilities Planning Board for final approval by the Superintendent. These decisions include approval of the NPGS Master Development Plan, establishment of MILCON priorities for the Master Development Plan, establishment and review of facilities requirements, and space allocation at the building and academic department level. The Plans Officer serves as collector, analyzer, and compiler of the information required by the FPB in their decision making. He also makes space allocation decisions on a daily basis that do not require action by the FPB. These include the reallocation or change in use of spaces within a department. His principal source document for decision making and supplying information to the Board on existing facilities, their capabilities, and usage rate

[1] All interviews referenced were conducted during Jan.1969.

is an inadequate and outdated 1955 NPGS Public Works publication entitled "Building and Space Locations and Assignments" [Ref. 4]. A sample page from this document is shown in Figure 2. The Plans Officer also disburses facility resource information along organizational lines when the requirement arises. He can also cross organizational lines in performing his liaison function to work directly with anyone facing facilities resource problems.

The Plans Officer also needs information for the preparation of periodical and special reports. Two of the periodic reports are extensive. The first is the OPNAV 1100 series on Shore Activity Facility requirements, current inventory, deficiencies, and correction of deficiencies. This report is submitted annually to the Bureau of Naval Personnel. The other is the Health, Education, and Welfare Department (HEW) report "Inventory of College and University Physical Facilities, OE FORM 2300-7." This report requires an initial submission and annual updating. An example of the special requests for information from outside agencies he receives would be a request from the Department of Defense for space to hold one of its Summer Study Sessions. Requests of this type are common and may require checking the availability of all spaces on the campus if the request is for a large number of rooms.

Thus the Plans Officer and FPB have a definite need for an expanded, readily available, and easily maintainable source of information on existing facilities,

Sample Page From

Building and Space Locations and Assignments

BUILDING #220 - SECOND FLOOR

Space No	Size	Area	Command	Dept	Usage
200	19'7"x17'	333	AdCom	BOQ	Lounge
	5'8"x7'2"	41	" "	"	
	3'7"x4'8"	17	" "	"	Passage
201	20'x16'8"	333.4	" "	"	Qtrs
	5'8"x7'2"	41	" "	"	Bath
202	14'x16'8"	232.4	" "	"	Qtrs
	5'8"x7'2"	41	" "	"	Bath
203	5'6"x5'8"	31.4	" "	"	Head
204	15'11"x19'6"	310.4	" "	"	Qtrs
	13'x5'8"	74.8	" "	"	Bath & Closet
	6'4"x5'8"	35.3	" "	"	BOQ
	7'2"x5'6"	39.4	" "	"	
	3'x2'4"	7	" "	"	
205	7'2"x5'6"	39.4	" "	"	Passage
	18'x19'6"	351	" "	"	Public Qtrs
	7'4"x5'6"	40.3	" "	"	Bath
206	18'10"x19'6"	367.2	" "	"	BOQ
	7'2"x5'6"	39.4	" "	"	Bath
	7'2"x5'6"	39.4	" "	"	Passage
207	15'x19'6"	292.5	" "	"	BOQ
	5'6" x 7'	38.5	" "	"	Bath
208	13'2"x19'6"	256.6	" "	"	
	6'6"x7'2"	46.5	" "	"	
209	6'8"x7'10"	52	" "	"	Storage
209A	6'3"x7'10"	50	" "	"	

Figure 2

their capabilities, and usage rate. This need will become even more acute by 1972 when the number of rooms at NPGS, as described in the Master Development Plan, is expected to expand from the present 2000 to approximately 3000.[2]

The interview with the Scheduler revealed that she is currently doing her job of quarterly schedule preparation by manually matching course requirements for student load and room capabilities against a manually updated cardex file containing classroom and laboratory capabilities and seating capacity. After the schedule is complete, she manually prepares the reports mentioned in the previous section. Upon completing the schedule she holds the only complete list of unoccupied rooms available for special uses. As a result she handles all one-time use requests for classrooms throughout the quarter. A typical request would be for a room in Spanagel Hall for 1000 Tuesday which would seat at least 35 people and is equipped with a projection screen. To answer such a request she must take the time to search the cardex file containing a card for each classroom to find a room with the required capabilities that is unoccupied at 1000 Tuesday. The Scheduler needs a readily available and easily maintainable source of information on classroom and laboratory spaces only, their capabilities, and their scheduled use. Equally important is an automated means of summarizing the data required for her daily and periodic requests for information.

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[2]Interview with the NPGS Plans Officer.

The Public Works Department's role in the facilities resource decision system is to administer the government housing (public quarters) and provide current and projected maintenance costs for all NPGS facilities. Maintenance costs are kept by building and not for each individual space. They also submit reports to other commands on maintenance costs for all facilities and on government housing occupancy rates. Thus their information needs would be served by: 1) an easily maintained and current public quarters inventory with associated occupancy rates and maintenance costs and, 2) a complete building inventory with related maintenance costs.

In summary, the primary information need of the managers within the facility resource decision system is a current, accurate source of information about existing facilities, their capabilities, usage rates, and maintenance costs. This source must be easily maintainable, readily available, and easy to use.

II. BASIS DESIGN

This chapter describes the design of the Building and Spaces Information System (BASIS) based on the previously defined needs of the facility resource decision system. While reviewing these needs it became apparent that the task of designing the entire system would require more time than was available for this thesis. A decision was then made concerning what portion of the design could be accomplished in the time frame of the thesis.

A. DESIGN RESTRICTIONS

It was decided to work toward satisfying the needs of the Facilities Planning Board, Plans Officer, and Scheduler and at the same time provide the base for future expansion of BASIS. This decision was based on the fact that this appeared to be where the most urgent needs were and the fact that work has already begun on the Public Works Information System.[3] Thus this initial version of the BASIS was designed to provide:

1) Information on the capabilities of all existing NPGS facilities at the individual space level.

2) Usage rates on all facilities located on the NPGS campus.

3) Detailed scheduling information and classrooms and laboratories.

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[3]Lochridge, R.K., A Proposal: Naval Postgraduate School Management Information System, p. 59, Naval Postgraduate School, December, 1968.

Maintenance costs were not included because they are recorded for entire buildings and not individual spaces. Public quarters occupancy rates, one of the possible interface points with the Public Works Information System, were not included because of the time limitation. The programing emphasis was directed toward creation of the data bank, retrieving the total record, and printing it in edited report format. File searches would not be implemented due to the time limitation.

B. SYSTEM DESIGN

The design of the system includes data element determination, logical record design, report design, file design and maintenance, and programing. Due to the complete incompatibility between the data elements chosen to describe the spaces on the NPGS campus and those chosen for the public quarters, an individual data bank was designed for each of them. The expected specific use of the classroom and laboratory scheduling information suggested another individual data bank to serve this need. The three data banks are referred to as the Public Quarters data bank, the Building and Spaces data bank, and the Classroom and Laboratory Usage data bank. Each of them will be discussed separately in the remainder of this section.

1. Data Elements

a. Building and Spaces

The building and spaces data bank contains data on all spaces except public quarters. It is intended to

provide complete and current information about existing facilities mentioned in Chapter I. It contains all the data elements found in the 1955 Public Works publication [Ref. 4] and several others. The RMS Classification categories were included and expanded somewhat since classrooms are included in the Academic category but are assigned to the Scheduler rather than an academic department. The capabilities of each room were explicitly delineated in terms of DC power, AC power, and other attributes such as water, natural gas, projection screens, etc.[4] The Navy Category Code and HEW Code were included to be used as keys for future search routines.[4]

b. Classroom and Laboratory Usage

The Classroom and Laboratory Usage data bank contains data elements on each classroom and laboratory so classified by the RMS. It is intended as a source of readily available usage information for use by the Scheduler in daily and periodic reporting. Each space is identified by number, capacity (student stations), and use. For each hour from 0800-1600 of each day of the academic week the data bank contains the number of students using the room, the curriculum of the students, and the academic department assigned to provide an instructor.[4] These data elements are manipulated to provide usage rate percentages (load factor) and empty room data.

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[4]See Appendix B, Section I, for details.

c. Public Quarters

The Public Quarters data bank contains data elements on each set of public quarters administered by NPGS Public Works Department. It is intended as the answer to the need for complete and current information on existing facilities. The data elements include such basic attributes as street name, quarters number, gross area, type unit and construction, year of construction, automobile storage available, and those items of basic equipment supplied by the Navy. The Navy Category Code and HEW Code were also included for further categorization.[5]

2. Logical Record Design

The logical record for each data bank was designed with two purposes in mind. The first and most important was to make data collection and preparation for keypunching as straight forward and simple as possible. The second was to arrange the record in such a manner as to make programing as efficient as possible. Sections I and II of Appendix B, the Users Manual, give a detailed explanation of any codes or abbreviations used and illustrate graphically the logical record length and format. The record lengths are fixed in all cases but the lengths and formats vary between data banks. Ample space was left at the end of both the Public Quarters and Building and Spaces records for additional data entries when the BASIS is expanded to include that

[5] See Appendix B, Section I, for details.

information needed, but not included, in the original design for reasons mentioned earlier. This expansion can be accomplished without changing the logical record length or the block size of the master file. These two master files are blocked 12 records to a block (a group of logical records on tape), while the Classroom and Laboratory Usage master file is blocked 10 records or 2 rooms to a block.

3. Report Design

As mentioned earlier, the BASIS was designed with three individual data banks which combine to compose the system data bank. These remain separate due to the incompatibility of data elements between banks and needs of the users. Rather than have every user receive the entire output, which would amount to approximately 270 pages, it was decided to let each user decide which report or combination of reports he desired.

The design of each individual data bank report (printed output) was intended to make the search for a particular record easier. For instance, the street name or building number is the first item listed in each report and is consistently located in the same place throughout the report. An example of the report from each data bank and the peripheral programs is shown in Section IV of Appendix B.

Each of the data processing programs for the three data banks includes error checking routines. These routines are designed to assist the user in insuring that data is

"error free" prior to using it to initiate the master file tape that forms each data bank. The error messages are designed to point the user to the card column or group of columns where the error exists on each card. An example of the error messages for each report plus the file maintenance program are available in Section IV of Appendix B.

4. File Design and Maintenance

Since the System 360 offers both tape and direct access (disk) storage devices, the design of the file or data bank for each of the three subsystems was done by giving careful consideration to the inherent characteristics of any file. These characteristics are file volatility, activity, and size.[6] It is expected that the volatility (the addition and deletion of records form a file) will be low due to the somewhat static nature of the Public Quarters and Building and Spaces data banks and due to the fact that the Classroom and Laboratory Usage data bank will be completely recreated every quarter. The amount of activity (frequency of file use) is not expected to exceed one access per week for the most highly used file. In terms of activity this is considered to be low. The size (the number of records in the file) of all these files is small, the largest being the Building and Spaces file with about 3000 records maximum within the next five years. An additional consideration is that probably no attempt will be

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[6] See Reference 2 for all questions concerning terminology used in this and following sections.

made to utilize the System 360/67 time-sharing terminals for BASIS data manipulation.

Based on low file volatility, low file activity, and small file size it was decided to organize the master file in a sequential manner using tapes as the file storage devices.

The sequential organization of each file is as follows:

1) Public Quarters: Alphabetical by street name and in ascending numerical order within street name according to house number.

2) Building and Spaces: Ascending numerical order by building number and room number within each building.

3) Classroom and Laboratory Usage: Alphabetical by building name and ascending numerical order by room number within each building.

Each of the three subsystems would utilize a separate tape volume, allowing unlimited apportunity for growth for the file. The queued sequential processing method was chosen for file maintenance. Using this method, the input transactions (change records) are grouped together (batched), sorted into the same sequence as the master file, and the resulting batch is then processed against the master file. The transaction file may be initialized on tape and sorted using the System 360 supplied SORT Procedure or it may be sorted on the card sorter and processed directly from the card reader.

As the entire NPGS Management Information System becomes active it may be desirable to change to one of

the direct access methods of processing in order to be more compatible with the rest of the system. This need is not forseen in the next five years.

5. Programing

All the programing for the processing of the BASIS data banks was done in System 360 Assembly Language (AL). This language was chosen for its efficiency, the ease with which file searches can be implemented and conducted using such instructions as Translate and Test, Test Under Mask, and Logical Compares, and because part of the NPGS MIS was already being programmed in AL. Admittedly, this language lacks the recursiveness of PL/I or LISP and programs written in it can be difficult to interpret and understand when improperly documented. However, these seeming liabilities can easily be overcome with a good understanding of the System 360 and the use of extreme care to insure that the program is documented in detail with both comments with the program listing and flow charts. The program listings immediately following Appendix B and the flow charts in Appendix A illustrate that extreme care was used in the preparation of program documentation for this system.

a. Fundamental Algorithms

One basic algorithm was used to do all error checking in the three programs. A single data field or a group of data fields were checked for blanks, special characters, alpha characters, or numeric characters as

applicable by loading the address of the first column to be checked into a register. The count in the register was then repeatedly incremented by one until the entire filed had been checked. Two Compare Logical Immediate (CLI) instructions were used to determine if the column contained a punch within the desired range of characters. Since the System 360 uses the Extended Binary Coded Decimal Interchange Code (EBCDIC) to hexidecimally represent all characters, a compare shows a blank smaller than the special characters, which show smaller than the alpha characters, which show smaller than the numeric characters [Ref. 1]. Examples of the error checking routines just described can be found throughout the program listings immediately following Appendix B.

A standard table look-up algorithm was used whenever an alpha or numeric code was used to represent a data item in a logical record. Once again the organization of characters plus their hexadecimal representation allowed easy conversion from a character to the core address of the desired table entry. Each character is represented by a full byte in the computer memory. The left half (4 bits) of the byte is called the zoned half and the right half the digit half. Thus the alpha character A is represented as C1, B as C2, and so on. Numeric characters are similarly represent, with F1 representing the number 1. It is the digit half of the character that is used in table look-up. Each entry in the table is the same fixed length.

The address of the first table entry minus the standard entry length for the table is loaded into a general purpose register. The zone half of the code character from the data field is the logically "ored" with zero, leaving only the digit half with any significance. This binary number is multiplied by the standard table entry length and the result added to the address originally loaded into the register to give the address of the desired entry. If the standard entry length is a power of 2 (2, 4, 8, 16, ...) the multiplication can be accomplished with the Shift Left Logical (SLL) instruction. Examples of this table look-up algorithm can be found throughout the Public Quarters and Building and Spaces program listings immediately following Appendix B.

The final algorithm of significance is the one used to perform the binary search in the Building and Spaces subsystem program. If a space is classified as Service or Tenant by the RMS Classification, then the Navy Category Code from the record must be converted to its descriptive phrase and the phrase printed. The codes and their descriptions were stored in a table. The address of the first entry was subtracted from the address of the last and divided by the standard entry length for that table to get the number of entries in the table. This number was then divided by 2 and the remainder added to the quotient (to insure that the entire table was searched) to find the entry number that represented the middle of the table. This

entry number was then multiplied by the standard entry length and added to the address of the first entry to obtain the address of the middle table entry. The category code of this entry was then compared with that in the record to determine which half of the table to search next and which half to disregard. This process was continued until an equal compare was found or the table search was complete. No attempt was made to store the middle address of the table permanently in the program, since this would reduce the flexibility presently available with the search. There are 75 entries in the table shown in the Building and Spaces program listing immediately following Appendix B. The search algorithm is designed to be used with up to 128 entries without requiring a change to the algorithm. To expand the table beyond 128 entries only the instruction that stops the search after 7 compares need be changed.

b. Program Integration

The three basic programs and the file maintenance program operate with three peripheral programs which initialize the master files and produce the Historical Load Factor and Quarterly Empty Room reports. The integration of all these programs into a foundation for BASIS is described in Section III (Data Processing) of Appendix B.

III. SYSTEM SEARCHES

The most obvious extension beyond the preparation of any data bank is the development of file search procedures. These are necessary to make the BASIS a true information system with selective data retrieval possible. This chapter will describe some of the searches that would be possible and useful from the existing files for each subsystem and give insight into how they might be initiated.

A. POSSIBLE SEARCHES

The possible types of data bank searches are many. They are reduced considerably, however, once a data bank organization has been chosen. In the case of the BASIS data bank, with its sequential organization, the choice is reduced to one, sequential. The reasons for sequential organization were given in section B. 4., Chapter II. The utilization of this type of search by no means reduces the ability to search or the thoroughness of the search.

It is possible to search any of the three files by keying on any data field that appears within the record formats illustrated in Section II of Appendix B. To do this, however, would be a waste of computer time, since some of the lists produced would be useless. A list of all possible searches reduced to those that are meaningful becomes a list of probable search items.

B. PROBABLE SEARCHES

1. Search of Individual Files

Probable searches include those that are required to retrieve information necessary for report submission, answering questions arising from short term local problems, and long range planning estimates. Probable searches pertaining to each data bank individually will be considered first, followed by those pertaining to more than one data bank.

a. Public Quarters File

The most likely search of the Public Quarters file would be keyed on Navy Category Code or basic equipment or both. It could provide individual lists of quarters by category code, including a square footage subtotal for each category, by basic equipment combinations, or by both category code and basic equipment. This information would be used both by the Plans Officer and the Public Works Department in report submission and as a basis to make long range projections of future housing requirements.

b. Building and Spaces File

The Building and Spaces file offers a wide range of data elements upon which to key. Once again, the Navy Category Code would be used to provide lists and square footage by code for use in the 1100 series reports submitted by the Plans Officer to the Bureau of Naval Personnel. Other items very likely to be keyed upon would be the HEW code, RMS Classification, various room capabilities,

academic department usage, and the Damage Control Plan (DCP) spaces. Each of these searches could produce a list of applicable rooms, the total number of spaces in a category, and square footage subtotals, if desired. The HEW code and RMS Classification lists and totals and a combination list would be used in the HEW report. The capabilities and departmental usage lists in combination could be used to determine what space allocation changes among academic and service departments are necessary as variations in curriculum sizes and/or corresponding department sizes occur. Additionally such reports could be used as justification for building programs as increases in student input are predicted. The DCP list would be used as just that, a list of authorized DCP spaces for use by the Plans Officer.

c. Classroom and Laboratory File

The Classroom and Laboratory Usage processing program already contains a very simple search that results in a list of empty classrooms and laboratories. Another search keyed on curriculum could produce a list of classrooms and laboratories used by each curriculum during a quarter or possibly just the number used. This information would be valuable in determining increased needs due to predicted increased curriculum size. Another search keyed on academic department could reveal the number of instructional hours per quarter each department is assigned and be used to equalize teaching loads between departments, according to size. Searches of this file are somewhat limited due to the small number of data elements.

2. Ultimate Searches

a. Classroom Scheduling

When the BASIS is fully developed, probably the most beneficial search or searches would be the one that would allow each quarter's scheduling to be done by the system. All the data elements required for such a program are already in the Building and Spaces data base. They are the RMS Classification of classroom and laboratory, the number of student stations in each room, the capabilities of each room, the building number, and the room number. A list of classrooms and laboratories with capabilities and number of student stations would be matched against the type room, number of students, and capabilities required for a given course. A secondary match would be done against building number in an attempt to schedule either in the professor's office building or in the building that the students were scheduled in during the previous hour. Naturally, after a match was found a weekly schedule block would have to be checked for available hours. The implementation of such a program could well be the subject of another thesis.

b. Scheduling Related Searches

Closely related to a scheduling search is the formation and maximum utilization of multi-purpose laboratories. The multi-purpose laboratory concept entails combining the capabilities of two or more existing but physically separate laboratories into one laboratory. A

search keyed on laboratory capabilities would produce lists of laboratories with enough similarities to be considered as candidates for combination. Both obtaining the list of candidates and the later scheduling of multi-purpose laboratories depend heavily on the ability to effictively search the BASIS data banks.

As the Master Development Plan is carried out major facilities reorganization and reallocation will be required. BASIS file searches could be used to efficiently implement this reorganization. Searches keyed to academic department space and usage categories would provide detailed lists of the space presently occupied by each department. Matching this information against the spaces available for allocation in the new buildings or reallocation in the old buildings would produce a list of all possible reorganization combinations. Additionally it would illustrate all the possibilities that existed among departments for reallocation of space.

c. Public Quarters Scheduling

The future inclusion of occupancy rates and maintenance information in the Public Quarters data bank would allow another useful search to be implemented. The date of predicted vacancy and the date of last major maintenance (painting, etc.) would be entered into the data bank as data elements for all quarters at the time of occupancy. A data bank search could then be performed at regular intervals to produce two lists based on date of

vacancy and the required maintenance frequency. One list would contain all quarters to be vacated by a certain date that would require maintenance. The other list would contain all quarters to be vacated by the same date that would not require maintenance. These lists would provide an easily maintained future occupancy and maintenance schedule.

C. SEARCH PROCEDURE CONCEPTS

It is impossible to describe a search procedure in great detail without actually flowcharting the logic. However, possible procedures for AL programmed searches can be suggested.

An extremely simple routine would be to search the entire file on one field, i.e., on one key using a logical compare instruction to locate the desired records. A slightly more sophisticated, but also more productive, method would be to set up a storage area the same size as the record and use each byte of the area to hold the mask for a Test Under Mask (TM) instruction. This would allow a file to be searched using the Boolean logic of "and," "or," and "not." AL provides the capability of setting the desired mask and then altering it logically [Ref.1].

Using the concepts presented above, the BASIS files could be searched very rapidly and thoroughly even though sequentially organized.

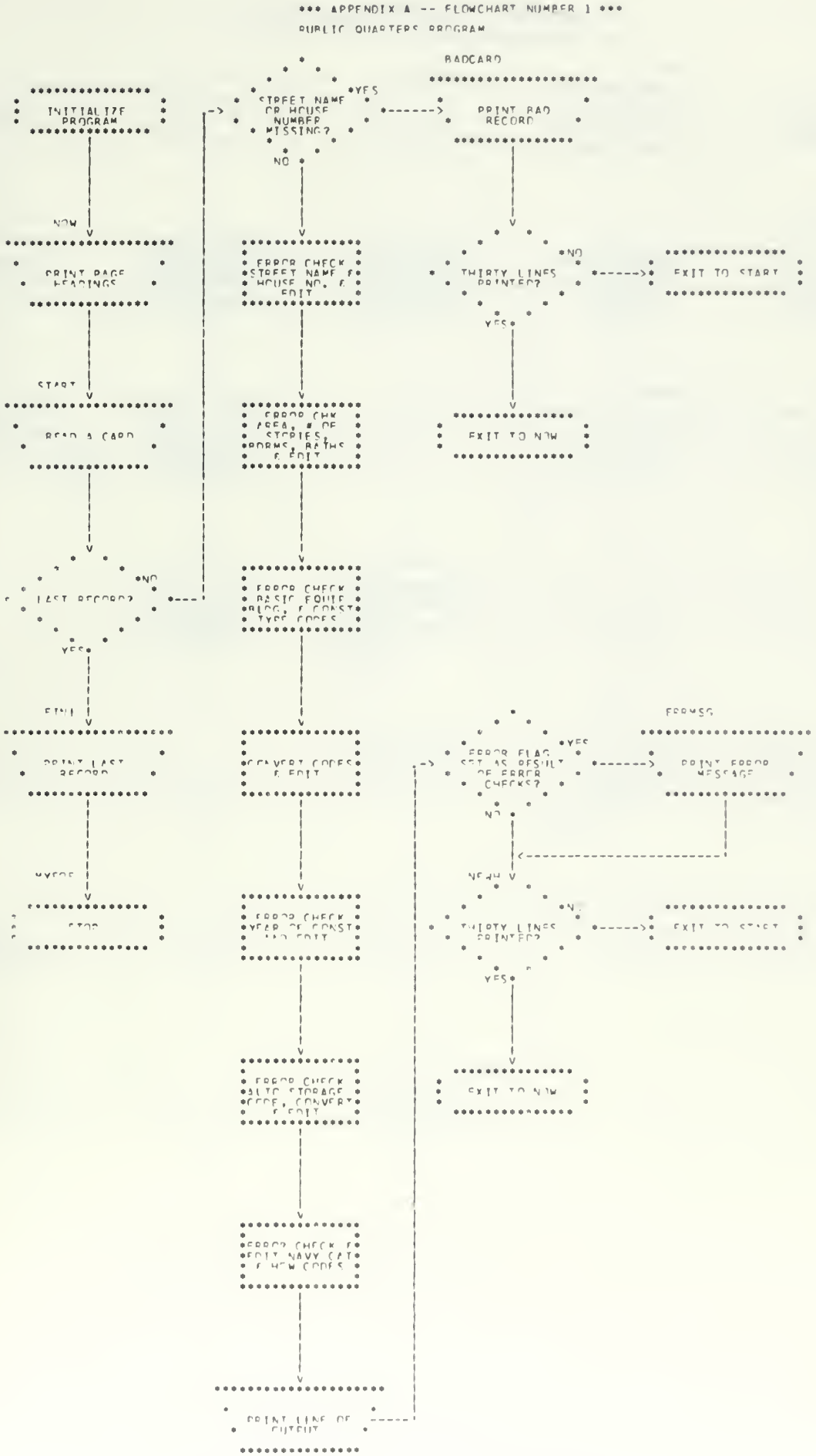
IV. CONCLUSIONS AND RECOMMENDATIONS

The preparation of the data bank for the BASIS was the initial step in the formation of a true information system. The collection and preparation of the data to fill this bank will be a considerable task and must necessarily be done with care and thoroughness if the data retrieval searches are to provide accurate, meaningful information for the NPGS managers to use in decision making. However, once this initial task is complete, system maintenance should require only one or two hours per week. In their present form the reports produced by the system will probably be most useful to the Facilities Planning Board, Plans Officer, and Scheduler. The searches considered in Chapter III are intended only as examples of those that might be implemented. As the system is developed and its capabilities become known to a greater number of managers, it is expected considerably larger number of searches will be required and uses found to meet everyone's needs.

There are certain recommendations that must necessarily be made if the system is to be of maximum usefulness. The Plans Officer, due to his position in the present system should be charged with the overall responsibility for both the initial data collection, system implementation, and maintenance. Direct assistance should be available from

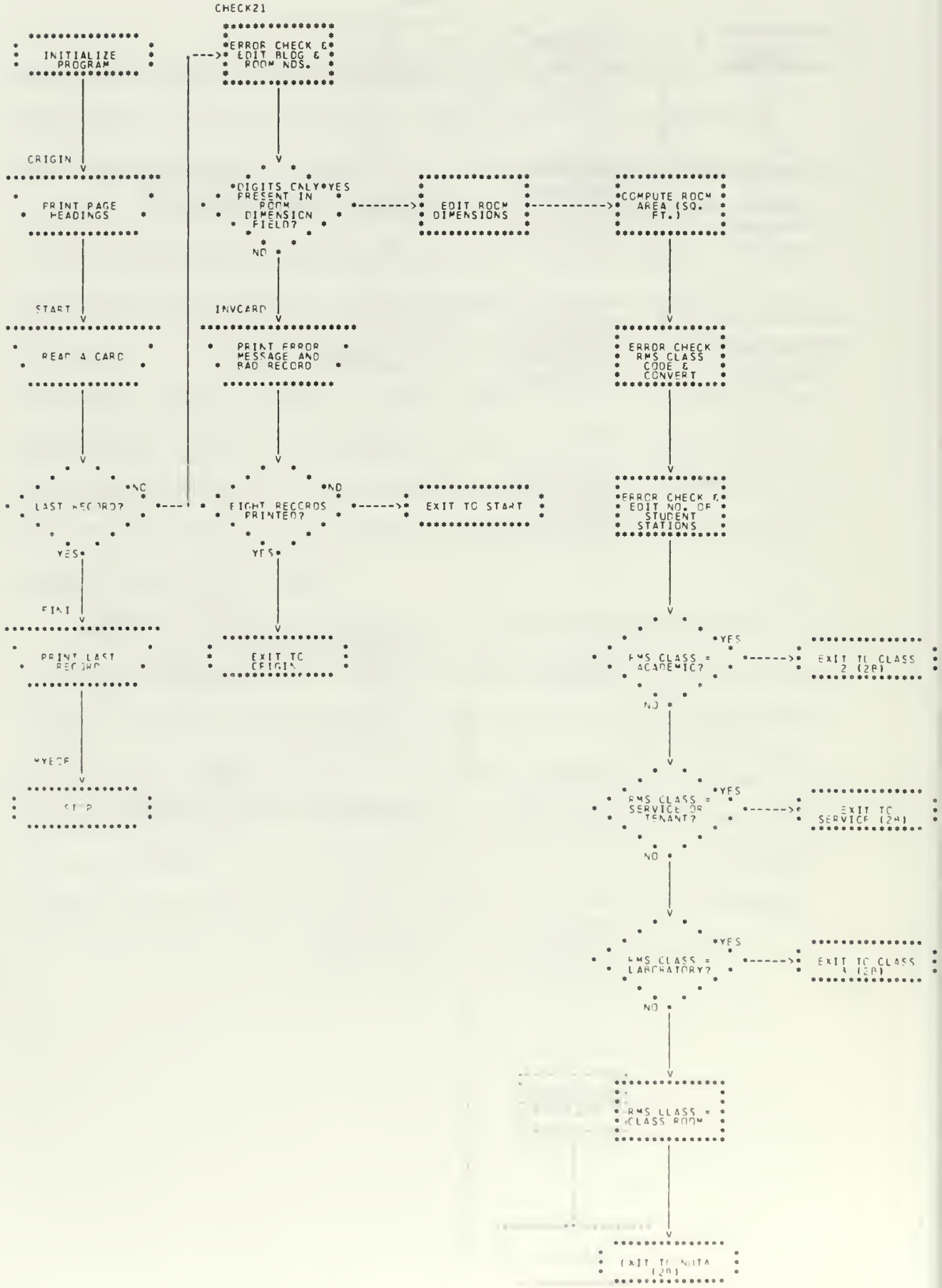
both the Scheduler and the Public Works Department. The importance of data collection and preparation cannot be over-emphasized and therefore, it is recommended that either a military staff member or a civilian emplyee with a good knowledge of NPGS operations be assigned to directly supervise this task as a primary duty for as long as is necessary. The activation and maintenance of the processing programs is not a task for one inexperienced in computer operations, so it is recommended that a NPGS Computer Facility Applications Programmer be assigned the task. This is currently the procedure for maintaining the NPGS Library Retrieval System.

Based on the experience of data bank preparation, it seems likely that a viable thesis could be done in system search routine preparation and every attempt should be made to accomplish this as soon as possible after the data collection and preparation is completed. This is even more important if a real effort is made to make the system capabilities known throughout NPGS, for the more capable the system the more users it will be able to satisfy.


*** APPENDIX A -- FLOWCHART NUMBER 1 ***
PUBLIC QUARTERS PROGRAM
INITIALIZE PROGRAM
NOW
PRINT PAGE HEADINGS
START
READ A CARD
LAST RECORD?
NO
YES
FINI
PRINT LAST RECORD
XYZZY
STOP
STREET NAME OR HOUSE NUMBER MISSING?
YES
NO
BADCARD
PRINT BAD RECORD
ERROR CHECK STREET NAME & HOUSE NO. & EDIT
ERROR CHK AREA, # OF STORIES, ROOMS, BATHS & EDIT
ERROR CHECK BASIC EQUIP, BLDG. & CONST TYPE CODES
CONVERT CODES & EDIT
ERROR CHECK YEAR OF CONST AND EDIT
ERROR CHECK ALTO STORAGE CODE, CONVERT & EDIT
ERROR CHECK & EDIT NAVY CAT & NEW CODES
PRINT LINE OF OUTPUT
THIRTY LINES PRINTED?
NO
YES
EXIT TO START
EXIT TO NOW
ERRMSG
ERROR FLAG SET AS RESULT OF ERROR CHECKS?
YES
NO
PRINT ERROR MESSAGE
NEWH
THIRTY LINES PRINTED?
NO
YES
EXIT TO START
EXIT TO NOW

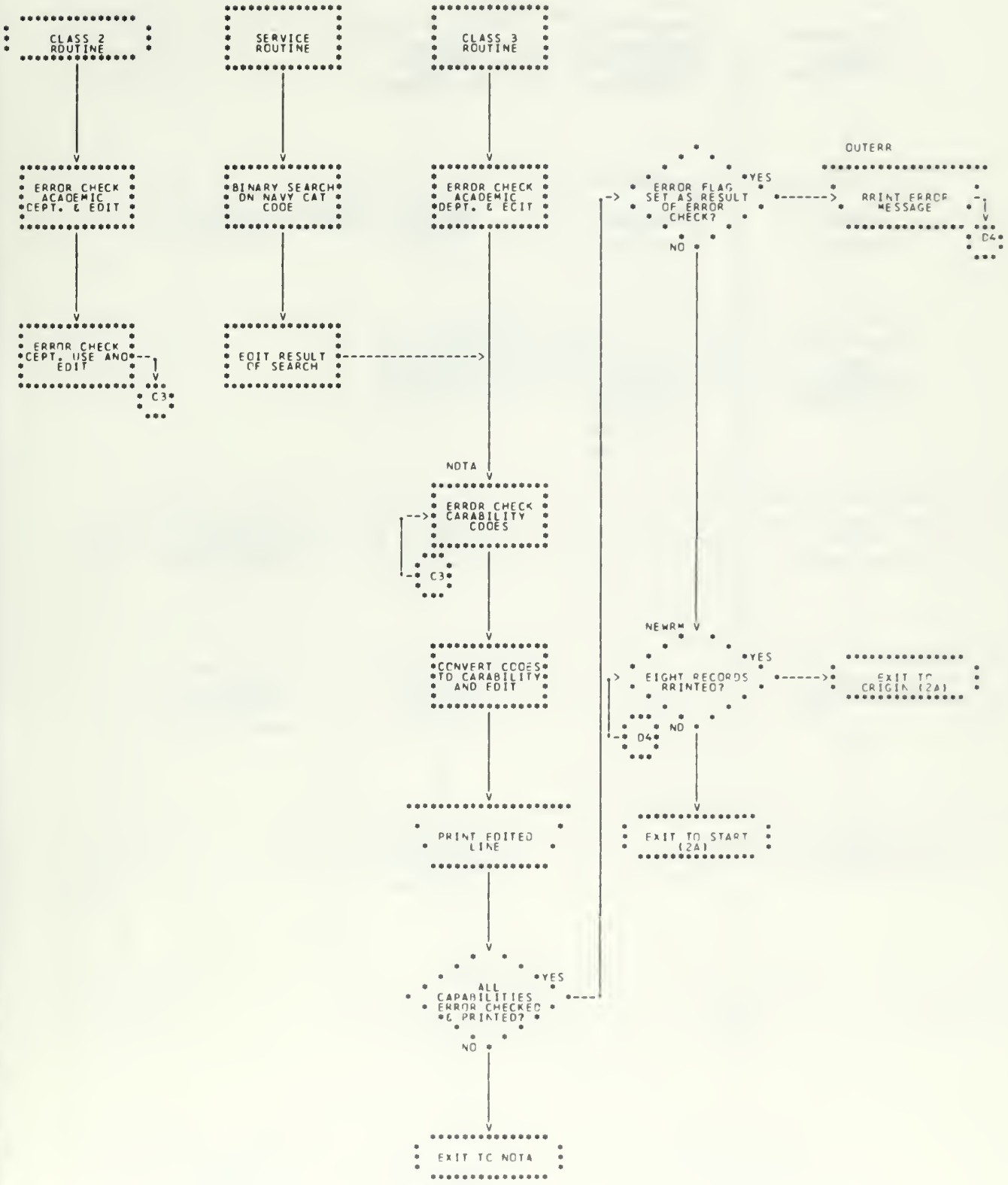
*** APPENDIX A -- FLOWCHART NUMBER 2A ***

BUILDING AND SPACES PROGRAM



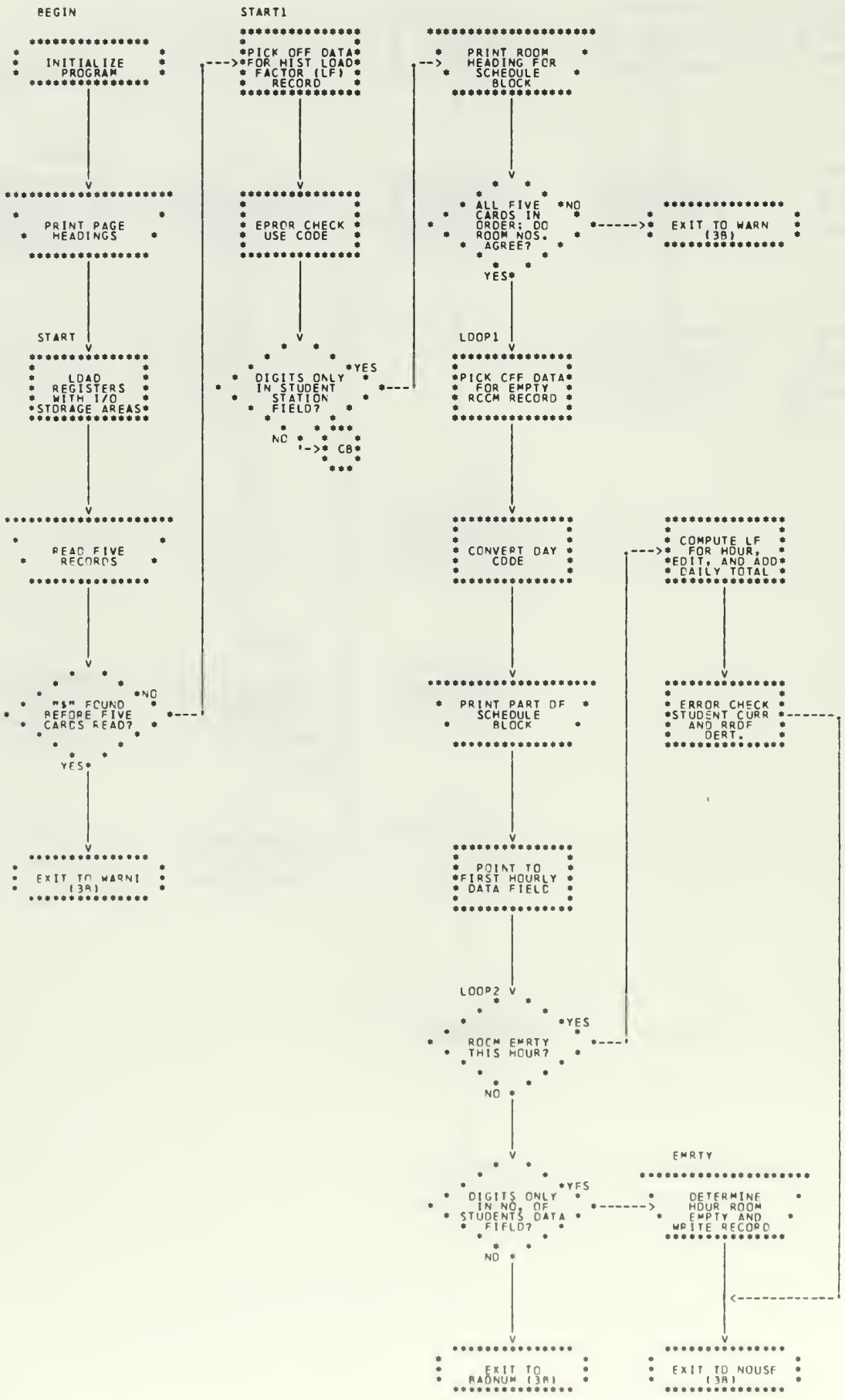
*** APPENDIX A -- FLOWCHART NUMBER 28 ***

BUILDINGS AND SPACES PROGRAM



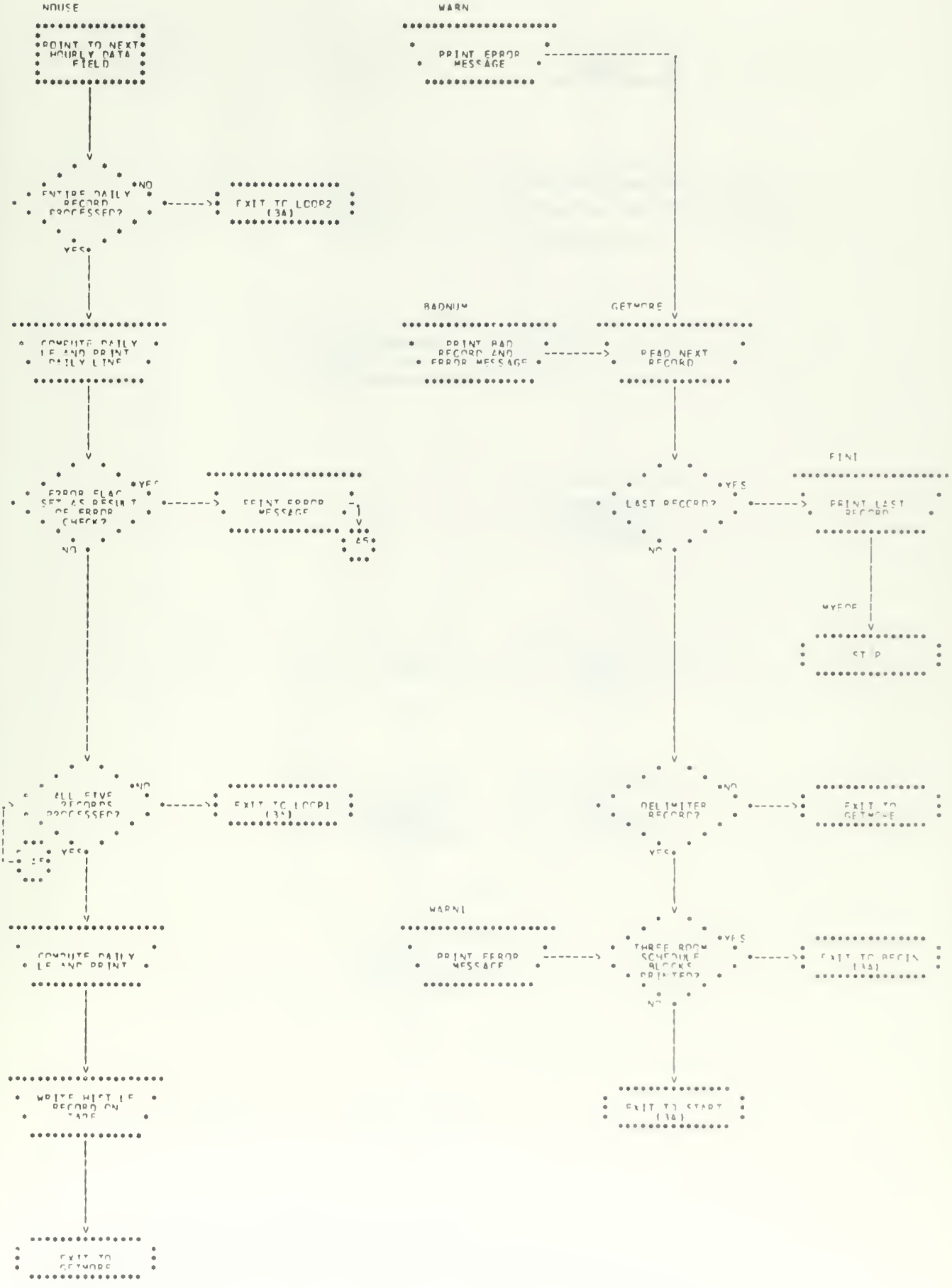
*** APPENDIX A -- FLOWCHART NUMBER 3A ***

CLASSROOM AND LABORATORY USAGE PROGRAM



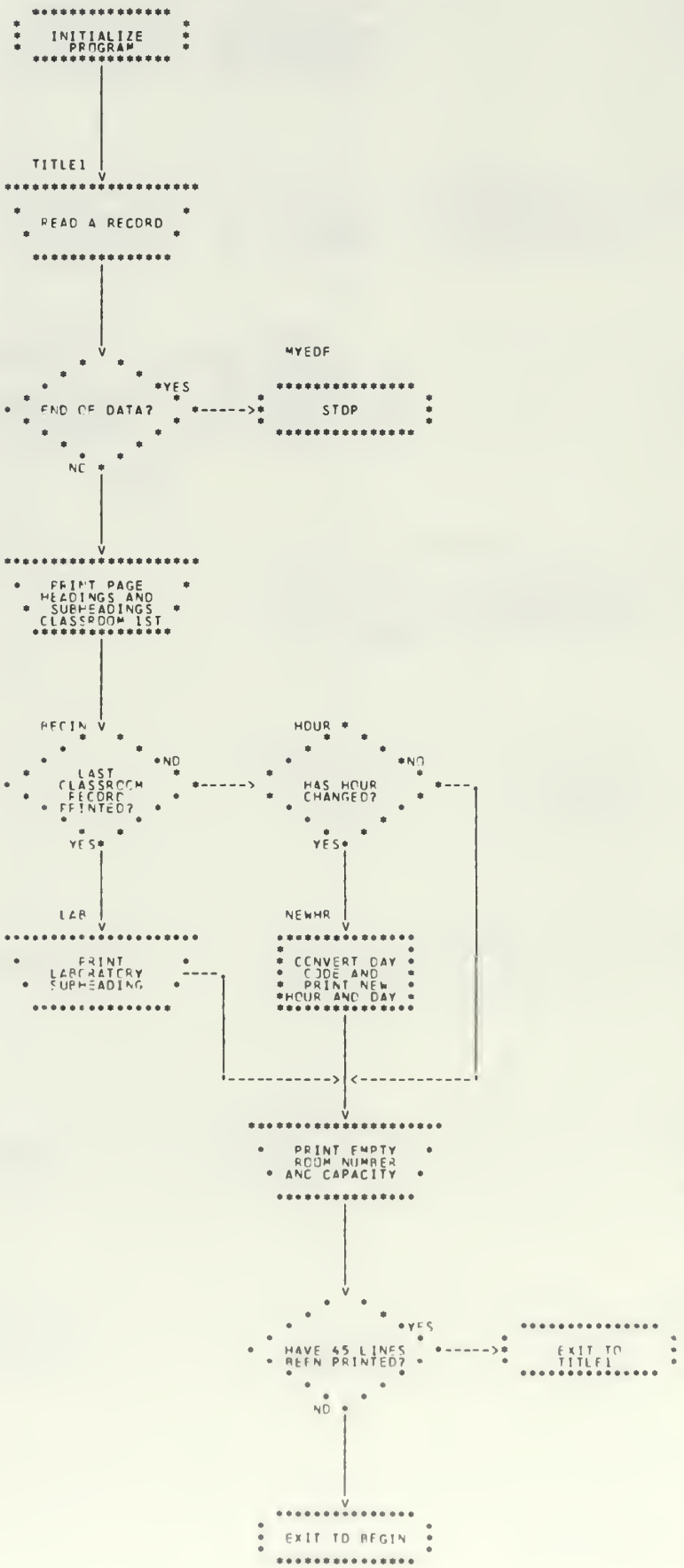
*** APPENDIX A -- FLOWCHART NUMBER 38 ***

CLASSROOM AND LABORATORY USAGE PROGRAM



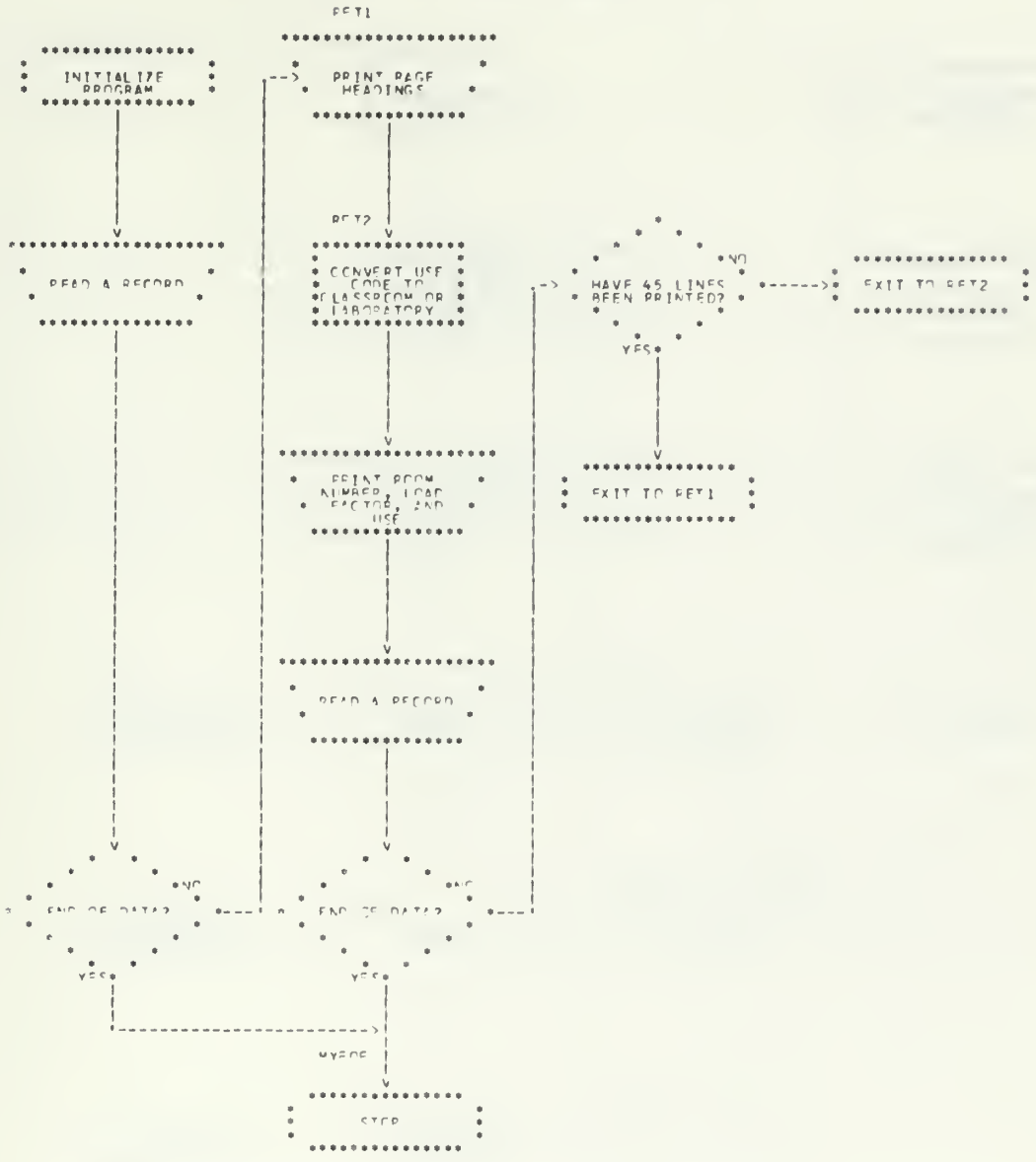
*** APPENDIX A -- FLOWCHART NUMBER 4 ***

PRINT OUT OF EMPTY ROOM DATA



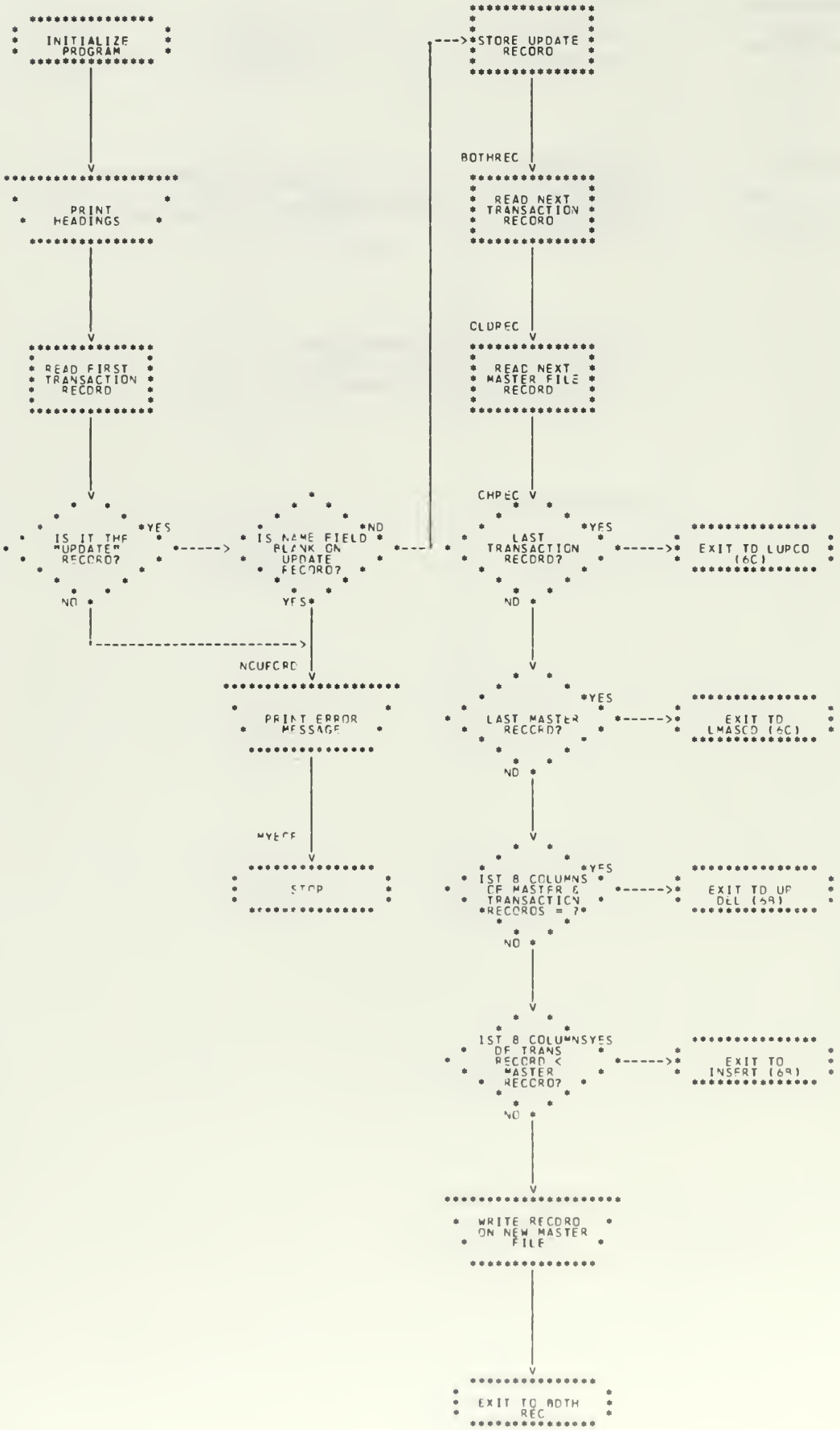
*** APPENDIX A -- FLOWCHART NUMBER 5 ***

PRINT OUT OF HISTORICAL LOAD FACTOR DATA



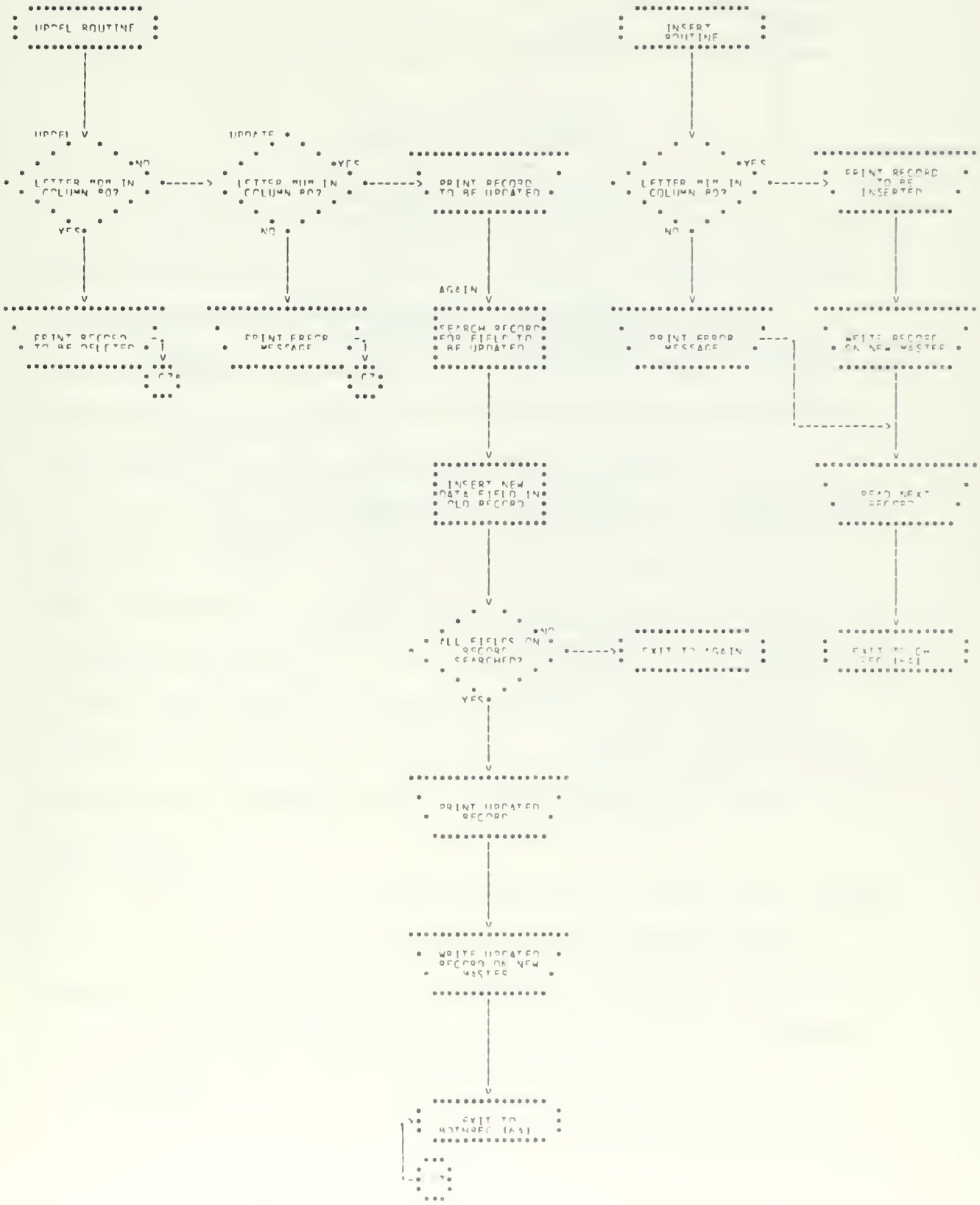
*** APPENDIX A -- FLOWCHART NUMBER 6A ***

FILE MAINTENANCE PROGRAM



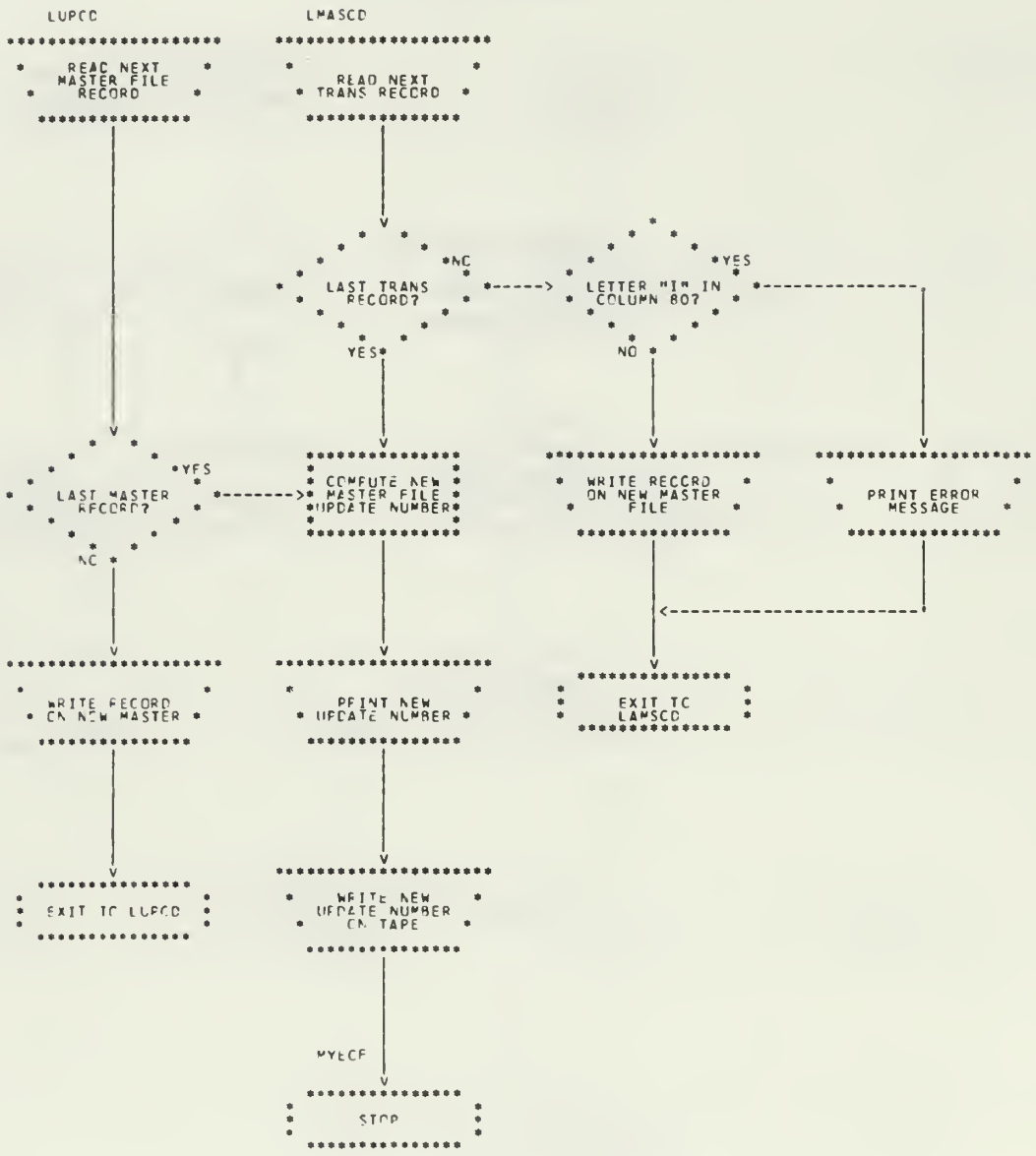
*** APPENDIX A -- FLOWCHART NUMBER 6B ***

FILE MAINTENANCE PROGRAM



*** APPENDIX A -- FLOWCHART NUMBER 6C ***

FILE MAINTENANCE



APPENDIX B

BASIS USERS MANUAL

This manual has been prepared as a guide for the implementation and use of the NPGS Building and Spaces Information System (BASIS). It provides guidelines for the classification and collection of building data, proper data formating for key-punching, and data processing utilizing the computer programs designed for the BASIS.

The contents of this manual are divided into four major sections as follows: Data Collection, Data Preparation, Data Processing, and Reports. Each of these sections is further subdivided into three subsections, one for each of the major BASIS processing programs whose listings immediately follow this appendix. A description of each major and peripheral program may be found in Section III of this appendix.

This manual is intended primarily for use by the person or persons charged with overall system implementation. Expanded guidelines will be required for those individuals involved in data collection and preparation. Applications Programmers should work from program listings generated by the card deck programs held by the Plans Officer and from Section IV of this manual.

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I. DATA COLLECTION

This section contains recommended procedures for the collection of data to fill the three data banks. The sample data collection forms provided for each bank may be used directly or serve as a guideline for preparation of other such forms that the user may see fit to use. It must be remembered that data collection must be complete and accurate if full value is to be obtained from the BASIS.

A. PUBLIC QUARTERS

The Public Quarters Data Collection Form (Figure 3) may be used to collect the data for this bank, which will contain data on all public quarters under control of the Naval Postgraduate School.

1. Data Sources and References

All but one of the data items required for input to this data bank can be taken directly from the Family Housing Detail NAVCOMPT FORM 277A kept by the NPGS Public Works Office. NAVDOCS P80 contains a formal definition of all data categories on FORM 277A. The item not carried on this form is the Health, Education, and Welfare (HEW) code described in the HEW Manual entitled "Higher Education Facilities Classification and Inventory Procedures." The HEW code for all NPGS public quarters is 0920 and can be permanently entered on the Public Quarters Data Collection Form (Figure 3).

BASIS FORM NO. 1

NPGS PUBLIC QUARTERS DATA COLLECTION FORM*

STREET NAME _____ HEW CODE 0920

HOUSE NUMBER	STORIES (30)	GROSS AREA (36)	BATHS (38) HALF/FULL	BASIC EQUIP				BUILDING TYPE (23)	CONSTRUC-TION (21)	YEAR (24)	AUTO (40) STORAGE	NAVY CATEGORY CODE	BEDROOMS (37)	REMARKS
				STOVE	REFRIG	GARBAGE GRINDER	NONE							

*NUMBERS IN PARENTHESIS INDICATE APPLICABLE NAVCOMPT FORM 277A BLOCK NUMBERS.

Figure 3

2. Data Definition and Collection Procedures

The data categories that follow combine to make up a single data record for Public Quarters. Each of the items will be found on the accompanying data collection form (Figure 3).

STREET NAME: Record street names as assigned in La Mesa Village. Record NPGS as street name for quarters located on the Naval Postgraduate School grounds.

HOUSE NUMBER: Record assigned house number for quarters located in La Mesa Village. Record the quarters number for those located on the NPGS grounds.

STORIES: Record the number from Block 30 of NAVCOMPT FORM 277A.

GROSS AREA: Record the number from Block 36 of NAVCOMPT FORM 277A.

BEDROOMS: Record the number from Block 37 of NAVCOMPT FORM 277A.

BATHS (HALF/FULL): Record the numbers from Block 38 of NAVCOMPT FORM 277A.

BASIC EQUIPMENT: Pick and record the applicable items from the following table:

Stove
Refrigerator
Garbage Grinder
None

BUILDING TYPE: Record the number from Block 23 of NAVCOMPT FORM 277A.

CONSTRUCTION: Record the description for the type checked in Block 21 of NAVCOMPT FORM 277A.

YEAR: Record the numbers from Block 24 of NAVCOMPT FORM 277A.

AUTO STORAGE: Record the number from Block 40 of NAVCOMPT FORM 277A.

NAVY CATEGORY CODE: Record the numbers from Block 27 of NAVCOMPT FORM 277A.

HEW CODE: Code 0920 is permanently recorded on the data collection form.

B. NPGS BUILDINGS AND SPACES

The NPGS Buildings and Spaces Data Collection Form (Figures 4 & 5) may be used to collect the data for this data on all buildings and spaces under the control of the Naval Postgraduate School except public quarters.

1. Data Sources and References

There is no single source of data available from which to gather the information for this data bank. The data collector should work in close contact with and take direction from the NPGS Plans Officer since he will be aware of the status of any recent physical plant surveys and maintains the most up-to-date copy of the 1955 Public Works publication entitled "Building Space Locations and Assignments," which might be used as a room-to-room guide. The Plans Officer also maintains a file of all planning and accomplishments of Task Group 3 of the Resources Management Systems Board from whom the Academic definitions come. He

BASIS FORM NO. 2A

BUILDING AND SPACES DATA COLLECTION FORM PAGE 1 of 2

BUILDING NAME _____ NUMBER _____ FLOOR _____

SPACE NUMBER	DIMENSIONS LENGTH / WIDTH	NAVY CAT. CODE / HEW CODE	STATIONS	RMS CLASSIFICATION: ACADEMIC: ACCESSORY	SPECIAL LAB.	RESEARCH LAB	OFFICE	CONFER. ROOM	STUDY ROOM	SUPPORT ACT.	STORAGE	LABORATORY	CLASSROOM	SERVICE	TENANT	REMARKS

Figure 4

BASIS FORM NO. 2B

BUILDING AND SPACES DATA COLLECTION FORM PAGE 2 of 2

SPACE NUMBER	C-A-P-A-B-I-L-I-T-I-E-S																								REMARKS
	AC POWER							DC POWER								OTHER									
	120V 60C 1PH	120V 60C 3PH	220V 60C 3PH	440V 60C 3PH	120V 400C 2PH	120V 400C 3PH		28V	120V	250V	400V	500V	2000V	BATTERY 125V		GAS	COMPRESSED AIR	VACUUM	H. WATER	C. WATER	SEA WATER	CC TV	SOUND	PROJECT. SCREEN	

Figure 5

BASIS FORM NO. 2A

BUILDING AND SPACES DATA COLLECTION FORM PAGE 1 of 2

BUILDING NAME _____ NUMBER _____ FLOOR _____

SPACE NUMBER	DIMENSIONS LENGTH / WIDTH	NAVY CAT. CODE / HEW CODE	STATIONS	RMS CLASSIFICATION: ACADEMIC: ACCESSORY	SPECIAL LAB.	RESEARCH LAB	OFFICE	CONFER. ROOM	STUDY ROOM	SUPPORT ACT.	STORAGE	LABORATORY	CLASSROOM	SERVICE	TENANT	REMARKS

Figure 4

BASIS FORM NO. 2B

BUILDING AND SPACES DATA COLLECTION FORM PAGE 2 of 2

SPACE NUMBER	C-A-P-A-B-I-L-I-T-I-E-S																									REMARKS
	AC POWER							DC POWER								OTHER										
	120V 60C 1PH	120V 60C 3PH	220V 60C 3PH	440V 60C 3PH	120V 400C 2PH	120V 400C 3PH		28V	120V	250V	400V	500V	2000V	BATTERY 125V		GAS	COMPRESSED AIR	VACUUM	H. WATER	C. WATER	SEA WATER	CC TV	SOUND	PROJECT. SCREEN	

Figure 5

also has a copy of the HEW Manual entitled "Higher Education Facilities Classification and Inventory Procedures Manual" from which the HEW codes come. NAVDOCS P-72 is available at the NPGS Public Works Office and contains a complete Navy Category Code listing.

2. Data Definition and Collection Procedures

The data categories that follow combine to make up a single data record for the Building and Spaces Data Bank and serve as an explanation for each data category found on the data collection form.

BUILDING NUMBER: Record the assigned NPGS building number.

SPACE NUMBER: Record the assigned space number and letter (if applicable) preceded by a single letter abbreviation for the building name (if applicable) from the following table:

LETTER	BUILDING
B	Bullard Hall
E	East Wing (Hermann)
H	Halligan Hall
I	Ingersoll Hall
R	Root Hall
S	Spanagel
W	West Wing (Hermann)

If the space is included in the NPGS Damage Control Plan, follow the space number with an asterick (*).

EXAMPLE: S101A*

DIMENSIONS: Record the length and width dimensions of the space measured to tenths of a foot.

NAVY CATEGORY CODE: Record the Navy Category Code for Real Property from the following table:

CODE	DESCRIPTION
122-10. . .	.MARINE REFUELING
123-10. . .	.FILLING STATION (EXCH)
124-50. . .	.VEH.READY FUEL STOR.TK.
131-15. . .	.COMMUNICATIONS CENTER
133-10. . .	.METERLOGICAL BLDG.
141-60. . .	.PHOTO-LAB
141-83. . .	.OPCON CENTER
151-20. . .	.BERTHING PIER
152-20. . .	.BERTHING WHARF
159-62. . .	.SMALL CRAFT BOATHOUSE
171-10. . .	.ACAD. & GEN. INSTRUCTION
171-20. . .	.APPLIED INSTRUCTION
171-25. . .	.AUDITORIUM (KING HALL)
211-50. . .	.ENGINE TEST CELL
213-41. . .	.CENTRAL TOOL SHOP
213-54. . .	.ELECTRIC SHOP
214-20. . .	.AUTO VEH. MAINT. FAC.
214-40. . .	.VEH. MAINTENANCE SHED
219-10. . .	.PUBLIC WORKS MAINT. FAC.
229-50. . .	.PRINTING PLANT
310-20. . .	.CHEMICAL LABORATORY
310-48. . .	.METALLURGY LABORATORY
310-54. . .	.NUC. PHYSICS & CHEM. LAB.
310-58. . .	.PHYSICS LABORATORY
310-75. . .	.MATHEMATICS BLDG.
310-86. . .	.GENERAL PURPOSE LAB.
310-87. . .	.APPLIED RESEARCH LAB.
310-88. . .	.ENVIRONMENTAL LABORATORY
442-10. . .	.GENERAL WAREHOUSE-R/1
442-65. . .	.CLOTHING & SMALL STORES
442-90. . .	.PUBLIC WORKS STORAGE
540-10. . .	.DENTAL CLINIC
550-10. . .	.DISPENSARY WITH BEDS
550-20. . .	.DISPENSARY WITHOUT BEDS
610-10. . .	.ADMIN. OFFICE
690-10. . .	.FLAGPOLE
721-20. . .	.EW BARRACKS WITHOUT MESS
722-10. . .	.EM BARRACKS WITHOUT MESS
723-10. . .	.MESS HALL
724-10. . .	.BOQ WITH MESS
724-30. . .	.OFFICERS MESS (CLOSED)
730-10. . .	.FIRE STATION
730-20. . .	.POLICE STATION
730-25. . .	.GATE/SENTRY HOUSE
730-65. . .	.AIR RAID/STORM SHELTER
740-10. . .	.CHAPEL
740-14. . .	.EXCHANGE

740-18. . . .BANK
740-19. . . .CREDIT UNION
740-20. . . .GUEST HOUSE
740-26. . . .CIV. CAFE/REST./SANCK BAR
740-33. . . .POST OFFICE
740-36. . . .HOBBY SHOP
740-40. . . .BOWLING ALLEY
740-43. . . .GYMNASIUM
740-60. . . .OFFICERS CLUB (OPEN)
740-63. . . .EM SERVICE CLUB
740-70. . . .CPO CLUB
740-74. . . .CHILD CARE CENTER
740-76. . . .LIBRABY
740-80. . . .GOLF CLUB HOUSE
750-10. . . .PLAYING COURT
750-20. . . .PLAYING FIELD & FAC.
750-30. . . .OUTDOOR SWINNING POOL
750-40. . . .GOLF COURSE
821-20. . . .HEATING PLANT, OIL
821-50. . . .STEAM PLANT
823-20. . . .GAS STORAGE TANKS
852-10. . . .PARKING AREA
852-20. . . .SIDEWALK
872-10. . . .SECURITY FENCING & WALLS
880-10. . . .FIRE ALARM SYSTEM
880-30. . . .AIR RAID ALARM SYSTEM
890-20. . . .COMPRESSED AIR PLANT
890-40. . . .AIR CONDITIONING PLANT
939-10. . . .HEAD
939-11. . . .HALLWAY
939-12. . . .STAIRWAY
939-20. . . .FLEET NUM. WEATHER CENTER
939-21. . . .NAVY SYSTEM MGT. CENTER

CAUTION: 1. If the code that best describes the space is not in the above table then so state on the data collection form and bring it to the attention of the data collection supervisor so it may be added to the table after consulting NAVDOCS P-72.

2. Items in the 939-XX category are locally defined.

HEW CODE: Record the HEW Code from the following table:

STANDARD TYPE OF ROOM CLASSIFICATION*

100 CLASSROOM FACILITIES

- 110 Classroom
- 115 Classroom Service

200 LABORATORY FACILITIES

- 210 Class Laboratory
- 215 Class Laboratory Service

- 220 Special Class Laboratory
- 225 Special Class Laboratory Service

- 230 Individual Study Laboratory
- 235 Individual Study Laboratory Service

- 250 Non-Class Laboratory
- 255 Non-Class Laboratory Service

300 OFFICE FACILITIES

- 310 Office
- 315 Office Service

- 350 Conference Room
- 355 Conference Room Service

400 STUDY FACILITIES

- 410 Study Rooms

- 420 Stack

- 430 Open-Stack Reading Rooms

- 440 Library Processing Rooms

- 455 Study Facilities Service

500 SPECIAL-USE FACILITIES

- 510 Armory Facilities
- 515 Armory Facilities Service

- 520 Athletic-Physical Education Facilities
- 523 Athletic Facilities Spectator Seating
- 525 Athletic-Physical Education Facilities Service

* HEW Manual

530 Audio-Visual, Radio, TV Facilities
535 Audio-Visual, Radio, TV Facilities Service

540 Clinic Facilities (Non-Medical)
545 Clinic Facilities Service (Non-Medical)

550 Demonstration Facilities
555 Demonstration Facilities Service

560 Field-Service Facilities

590 Other Special-Use Facilities
595 Other Special-Use Facilities Service

600 GENERAL-USE FACILITIES

610 Assembly Facilities
615 Assembly Facilities Service

620 Exhibition Facilities
625 Exhibition Facilities Service

630 Food Facilities
635 Food Facilities Service

640 Health Facilities (Student)
645 Health Facilities Service (Student)

650 Lounge Facilities
655 Lounge Facilities Service

660 Merchandising Facilities
665 Merchandising Facilities Service

670 Recreation Facilities
675 Recreation Facilities Service

690 Other General-Use Facilities
695 Other General-Use Facilities Service

700 SUPPORTING FACILITIES

710 Data Processing-Computer Facilities
715 Data Processing-Computer Facilities Service

720 Shop Facilities
725 Shop Facilities Service

730 Storage Facilities
735 Storage Facilities Service

740 Vehicle Storage
745 Vehicle Storage Service

750 Central Food Stores

760 Central Laundry

790 Other Supporting Facilities
795 Other Supporting Facilities Service

800 MEDICAL CARE FACILITIES

810 Human Hospital-Clinic Facilities
815 Human Hospital-Clinic Facilities Service

820 Human Hospital-Patient Care Facilities
825 Human Hospital-Patient Care Facilities Service

840 Dental Clinic Facilities
845 Dental Clinic Facilities Service

850 Veterinary Hospital-Clinic Facilities
855 Veterinary Hospital-Clinic Facilities Service

860 Veterinary Hospital-Animal Care Facilities
865 Veterinary Hospital-Animal Care Facilities Service

900 RESIDENTIAL FACILITIES

910 Residence for Single Persons

911 Dormitory

912 Food Service in Residence Halls

920 One-Family Dwelling

930 Multiple Family Dwelling

999 PRORATE

000 NON-ASSIGNABLE AREA

010 Custodial Area

020 Circulation Area

030 Mechanical Area

040 Construction Area

080 UNASSIGNED AREA

081 Inactive Area

082 Alteration or Conversion Area

083 Unfinished Area

RMS CLASSIFICATION: Record the proper classification from the following table of definitions:

ACADEMIC: This category contains all spaces assigned to academic departments except laboratories. (See Department Use category for all possible entities under this category)

CLASSROOM: All instructional rooms used chiefly for lecture, recitation, and seminar type class meetings.

LABORATORY: All instructional rooms equipped for experiments with general purpose equipment.

TENANT: Any military activity classified as a tenant activity by the Plans Officer.

SERVICE: All spaces not assigned to one of the above categories.

STATIONS: Record the seating capacity of the space. If this category is not applicable to a particular space record NA.

AC POWER: Record none, any, or all of the items from the following table depending on the room's AC power capabilities.

120V	60C	1PH
120V	60C	3PH
220V	60C	3PH
440V	60C	3PH
120V	400C	2PH
120V	400C	3PH

DC POWER: Record none, any, or all of the items from the following table depending on the room's power capabilities.

28V
120V
250V
400V
500V
2000V
Bat.125V

OTHER: Record none, any, or all of the items from the following table depending on the additional capabilities of the room:

GAS
COMP AIR
VACUUM
H. WATER
C. WATER
SEA WATER
CC TV
SOUND
SCREEN

DEPARTMENT: If Academic or Laboratory is selected from NPGS CLASSIFICATION category, then record the code for the academic department to which the space is assigned from the following table:

CODE	DEPARTMENT
AERO	AERONAUTICS
BADM	BUSINESS ADMINISTRATION AND ECONOMICS
EENG	ELECTRICAL ENGINEERING
GOVN	GOVERNMENT AND HUMANITIES
MATH	MATHEMATICS
CHEM	MATERIAL SCIENCE AND CHEMISTRY
MENG	MECHANICAL ENGINEERING
METR	METEOROLOGY
OPAN	OPERATIONS ANALYSIS
OCEA	OCEANOGRAPHY
PHYS	PHYSICS

DEPARTMENT USE: If Academic is selected from NPGS CLASSIFICATION category, then record the departmental use from the following table of categories with their definitions:

SPECIAL PURPOSE LABORATORY: An instructional room equipped for experiments but limited by its configuration or installed equipment to a fairly specific use. Examples are: Anechoic Chamber, Reactor Facility, Linear Accelerator, and to a lessor extent most Chem labs, Radar lab, Underwater Acoustics lab.

RESEARCH LABORATORY: A special purpose room providing research facilities and not made available for regular class meetings. This includes rooms used by graduate

students for individual research and thesis. Rooms assigned to individual faculty members as offices were excluded on the premise that their principle use was for administrative functions. (Faculty offices were designated "Office")

STUDENT STUDY SPACE: A room designated for student study. No thesis rooms were included in this category.

OFFICE: Academic and clerical rooms or suites of rooms with office-type equipment assigned to one or more staff member for the performance of administrative, clerical, or faculty duties other than meeting of classes. Waiting rooms, office files, and interconnecting corridors within a suite of offices, private toilets, and coffee messes will be included under a sub-category of Office Service Area. Examples in this category and sub-category are: offices assigned to professors, curricula offices, lab offices, faculty lounge, coffee messes, rooms containing duplicating machines.

CONFERENCE ROOM: A room generally equipped with a large table and chairs, to which classes or staff members are not regularly assigned.

SUPPORT ACTIVITY: Spaces containing such supporting activity for academic/lab facilities as: glass shop, machine shops, instrument/machine repair shops, technical libraries, general laboratory technician work spaces. Note that these are for academic department support and not Public Works.

STORAGE: Rooms or sections partitioned off and permanently used for storage. Cabinets and bins located in class/lab rooms and containing routinely used equipment are not included. Rooms used for issue of laboratory equipment to students (such as electronics components) are included as storage.

ACCESSORY: A general category for the inclusion of all rooms and areas within a building existing for the convenience of all who use the buildings, such as corridors, lobbies, stairwells, elevators, and public rest rooms, and for the maintenance and servicing of the building, such as janitorial closets, furnace rooms, utilities spaces, and electrical access spaces. Corridors, lobbies, stairwells, and elevators are subcategorized as Circulatory Space.

C. CLASSROOM AND LABORATORY USAGE

The Classroom and Laboratory Usage Data Collection Form (Figure 6) may be used to collect the data for this bank which will contain usage data on each classroom and laboratory at Naval Postgraduate School by day, hour, and week.

1. Data Sources and References

The data required for this data bank can be obtained from the NPGS Scheduler when each quarter's schedule is published.

2. Data Definition and Collection Procedures

The data categories that follow combine to make up a single data record for Classroom and Laboratory Usage.

ROOM NUMBER: Record the room number as assigned preceded by a letter code from the following table:

CODE	BUILDING
B	BULLARD HALL
E	EAST WING (HERMANN)
H	HALLIGAN HALL
I	INGERSOLL HALL
R	ROOT HALL
S	SPANAGEL
W	WEST WING (HERMANN)

STATIONS: Record the number of student stations (seat or lab. positions) as a 3 digit number.

QUARTER/YEAR: Record the quarter and academic year to which the data applies.

USAGE CODE: Record the use of the room as Classroom or Laboratory.

BASIS FORM NO. 3

CLASSROOM AND LABORATORY USAGE DATA

ROOM NO. _____ STATIONS _____ QUARTER/YEAR ____/____

HOUR / DAY OF WEEK	0800			0900			1000			1100			1200			1300			1400			1500			1600		
	NUMBER OF STUDENTS	CURRICULUM	PROFESSOR DEPT.	NUMBER OF STUDENTS	CURRICULUM	PROFESSOR DEPT.	NUMBER OF STUDENTS	CURRICULUM	PROFESSOR DEPT.	NUMBER OF STUDENTS	CURRICULUM	PROFESSOR DEPT.	NUMBER OF STUDENTS	CURRICULUM	PROFESSOR DEPT.	NUMBER OF STUDENTS	CURRICULUM	PROFESSOR DEPT.	NUMBER OF STUDENTS	CURRICULUM	PROFESSOR DEPT.	NUMBER OF STUDENTS	CURRICULUM	PROFESSOR DEPT.	NUMBER OF STUDENTS	CURRICULUM	PROFESSOR DEPT.
MONDAY																											
TUESDAY																											
WEDNESDAY																											
THURSDAY																											
FRIDAY																											

CIRCLE ONE:
CLASSROOM
LABORATORY

REMARKS:

Figure 6

HOURLY DATA: The following categories are to be recorded for each hour of the week.

NUMBER OF STUDENTS: Record the number of students assigned to a room for any given hour as a 3 digit number. If the room is not used record 000.

CURRICULUM: Record the curriculum of the majority (50%) or more of students assigned for each hour that the room is in use from the following table:

CODE	CURRICULUM
AE	AERONAUTICAL ENGINEERING
CE	ELECTRONICS AND COMMUNICATIONS ENGINEERING
OE	ORDNANCE ENGINEERING
NE	NAVAL ENGINEERING
EV	ENVIRONMENTAL SCIENCES
OA	OPERATIONS ANALYSIS
MG	MANAGEMENT
CM	COMPUTER SYSTEMS MANAGEMENT
CS	COMPUTER SCIENCE
ES	ENGINEERING SCIENCE
BA	BACCALAUREATE
XX	NO MAJORITY

PROFESSOR'S DEPARTMENT: Record the department that is responsible for supplying the professor for each hour the room is in use from the following table:

AE	AERONAUTICS
EE	ELECTRICAL ENGINEERING
MA	MATHEMATICS
CH	MATERIAL SCIENCE AND CHEMISTRY
OA	OPERATIONS ANALYSIS
GV	GOVERNMENT AND HUMANITIES
MO	METEOROLOGY
ME	MECHANICAL ENGINEERING
OC	OCEANOGRAPHY
PH	PHYSICS
BA	BUSINESS ADMINISTRATION AND ECONOMICS

II. DATA PREPARATION

This section contains instructions for taking the data from the data collection form and properly formatting it on a keypunch form for keypunching. It is extremely important that the formatting instructions be closely followed to insure that the data will be accepted by the data processing program.

A. PUBLIC QUARTERS

This section contains record format, preparation instructions, and file update format for all records to be included in the Public Quarters Data Bank .

1. Data Record Format

   See Figure 7.

2. Preparation Instructions

This section provides instructions for formatting each data item found on the Public Quarters Data Collection Form (Figure 3). The space numbered "1" on the data record format refers to the left most similarly numbered column on the standard keypunch coding form and the standard IBM computer card.

COLUMNS 1-10 (STREET NAME)

a. Enter the first 10 letters of the street name in these columns.

b. If street name is less than 10 letters leave the remaining columns blank.

DATA RECORD FORMAT

(PUBLIC QUARTERS)

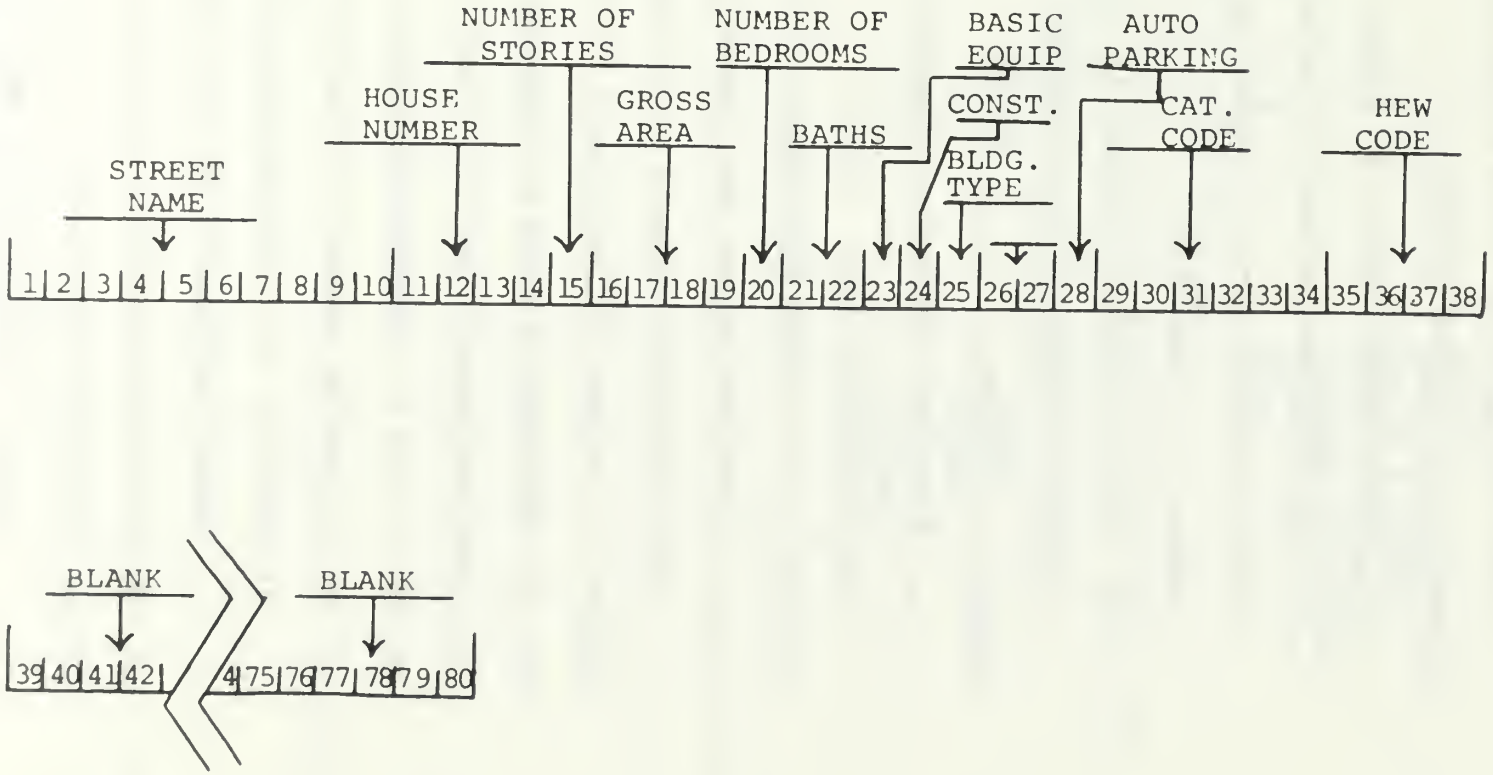

NUMBER OF STORIES
NUMBER OF BEDROOMS
BASIC EQUIP
AUTO PARKING
HOUSE NUMBER
GROSS AREA
BATHS
CONST.
CAT. CODE
HEW CODE
STREET NAME
BLDG. TYPE
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38
BLANK
BLANK
39 40 41 42
74 75 76 77 78 79 80

Figure 7

c. If quarters are located on NPGS grounds enter NPGS in the first 4 columns.

COLUMNS 11-14 (HOUSE NUMBER)

a. Enter house number in these columns.

b. If NPGS was entered in column 1-4 then enter QTR in columns 11-13 followed by the appropriate letter in column 14.

c. If the quarters number is less than 4 digits leave the unused columns blank.

COLUMN 15 (NUMBER OF STORIES)

a. Enter the number of stories directly from the Data Collection Form.

COLUMNS 16-19 (GROSS AREA (SF))

a. Enter the gross area directly from the Data Collection Form.

COLUMN 20 (NUMBER OF BEDROOMS)

a. Enter the number of bedrooms directly from the Data Collection Form.

COLUMN 21 and 22 (NUMBER OF BATHS)

a. Enter the number of half baths in column 21 directly from the Data Collection Form.

b. Enter the number of full baths in column 22 directly from the Data Collection Form.

COLUMN 23 (BASIC EQUIPMENT)

a. Enter a single digit from the following table to reflect basic equipment available in the dwelling:

DIGIT	DESCRIPTION
1	Stove
2	Refrig
3	Garb Disposal
4	Stove & Refrig
5	Stove & Disposal
6	Refrig & Disposal
7	Stove, Ref, Disp
8	None

COLUMN 24 (CONSTRUCTION)

a. Enter a digit from the following table to indicate the construction type:

DIGIT	TYPE
1	Frame
2	Masonry
3	Stucco
4	Other

COLUMN 25 (BUILDING TYPE)

a. Enter the number directly from the Data Collection Form.

COLUMNS 26 and 27 (YEAR)

a. Enter the last 2 digits of the year directly from the Data Collection Form.

COLUMN 28 (AUTO PARKING)

a. Enter the number directly from the Data Collection Form.

COLUMNS 29-34 (NAVY CATEGORY CODE)

a. Enter the numbers directly from the Data Collection Form. Example: 724-30

COLUMNS 35-38 (HEW CODE)

a. The only valid entry in these columns is 0920.

COLUMNS 36-80 (BLANK)

3. File Updating Format

This section contains instructions for formatting a file update record.

a. File Access

In order to gain access to the master file it is required that the first record be of the following form. Starting in column 10 put the word UPDATE followed by 5 blanks followed by the word BY followed by a blank followed by the last name of the person making the update.

EXAMPLE: UPDATE BY ARNOLD

b. Record Insert

Prepare the record as an original and indicate that it is a record to be inserted in the Master File by entering the letter I in column 80 of the card.

c. Record Deletion

Prepare columns 1-14 as an original, leaving columns 15-79 blank. Enter the letter D in column 80 of the card to indicate the record is to be deleted from the Master File.

d. Record Update

Prepare columns 1-14 as above. Enter the data for updating in columns as if preparing an original record, leaving these columns blank where data on the Master File is to remain unchanged. Enter the letter U in column 80 of the card to indicate that the Master File record is to be updated.

B. NPGS BUILDING AND SPACES

This section contains record format, preparation instructions, and file update format for all records to be included in the NPGS Building and Spaces Data Bank.

1. Data Record Format

See Figure 8.

2. Preparation Instructions

This section provides instructions for formatting each data item found on the NPGS Building and Spaces Data Collection Form (Figures 4 & 5). The space numbered "1" on the data record format refers to the left most similarly numbered column on the standard keypunch coding form and the standard IBM computer card.

COLUMNS 1-3 (BUILDING NUMBER)

a. Enter the 3 digit building number directly from the Data Collection Form.

COLUMNS 4-8 (ROOM NUMBER)

a. Enter the room number directly from the Data Collection Form.

b. Leave blank if no room number appears on the Data Collection Form.

COLUMN 9 (DCP CODE)

a. Enter an asterick (*) if it appears after the room number on the Data Collection Form, otherwise leave blank.

DATA RECORD FORMAT

(BUILDING AND SPACES)

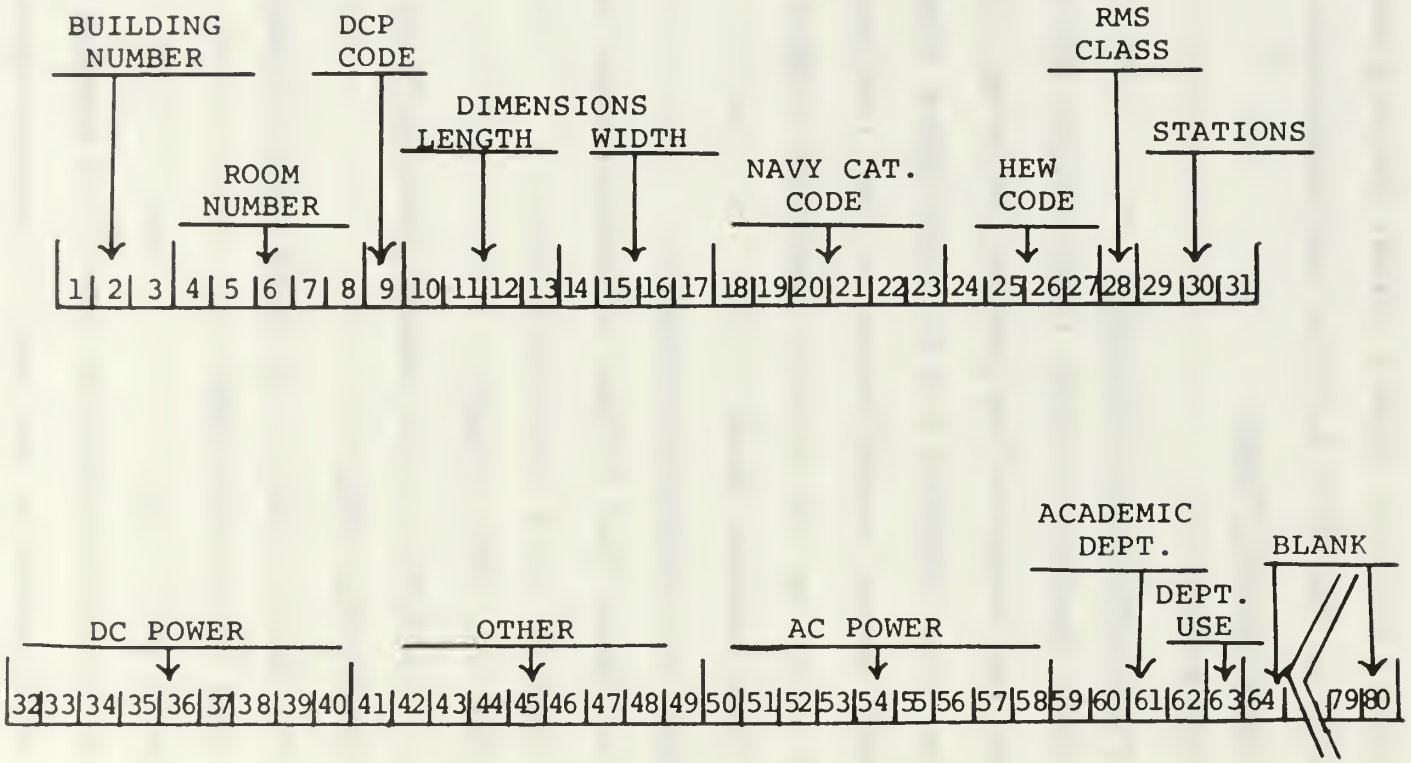

BUILDING NUMBER
DCP CODE
DIMENSIONS
LENGTH
WIDTH
RMS CLASS
STATIONS
ROOM NUMBER
NAVY CAT. CODE
HEW CODE
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
ACADEMIC DEPT.
BLANK
DEPT. USE
DC POWER
OTHER
AC POWER
32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 79 80

Figure 8

COLUMNS 10-13 (DIMENSION, LENGTH)

a. Enter a 4 digit number for room length from the Data Collection Form. DO NOT enter the decimal point from the Data Collection Form on the key-punching form.

EXAMPLE: 45.2' on the Collection Form would be entered as 0452 for keypunching.

COLUMNS 14-17 (DIMENSION, WIDTH)

a. Enter a 4 digit number as was done for the length dimension.

COLUMNS 18-23 (NAVY CATEGORY CODE)

a. Enter the Navy Category code directly from the Data Collection Form.

EXAMPLE: 171-10

COLUMNS 24-27 (HEW CODE)

a. Enter the HEW Code directly from the Data Collection Form as a 4 digit number.

COLUMN 28 (NPGS CLASSIFICATION)

a. Enter a letter code from the following table to indicate classification:

LETTER	CLASSIFICATION
A	ACADEMIC
B	SERVICE
C	CLASSROOM
D	TENANT
E	LABORATORY

COLUMN 29-31 (STATIONS)

a. Enter a 3 digit number directly from the Data Collection Form. Enter NA in columns 29 and 30 if it appears on the Form, leaving column 31 blank.

COLUMNS 32-40 (AC POWER)

a. Enter a letter code (one per column) from the table below for each of the AC power capabilities listed on the Data Collection Form:

CODE	CAPABILITY
A	120V 60C 1PH
B	120V 60C 3PH
C	220V 60C 3PH
D	440V 60C 3PH
E	120V 400C 2PH
F	120V 400C 3PH

b. Columns 38-40 must be left blank.

c. Leave the entire field blank if no capabilities are listed on the Data Collection Form.

EXAMPLE: ACE

COLUMNS 41-49 (OTHER)

a. Enter a letter code (one per column) from the table below for each of the OTHER capabilities listed on the Data Collection Form:

CODE	CAPABILITY
J	GAS
K	COMP AIR
L	VACUUM
M	H. WATER
N	C. WATER
O	SEA WATER
P	CC TV
Q	SOUND
R	SCREEN

b. Leave the entire field blank if no capabilities are listed on the Data Collection Form.

EXAMPLE: LMNR

COLUMNS 50-57 (DC POWER)

a. Enter a letter code (one per column) from the table below for each of the DC power capabilities listed on the Data Collection Form:

CODE	CAPABILITY
S	28V
T	120V
U	250V
V	400V
W	500V
X	2000V
Y	BAT. 125V

b. Column 57 must be left blank.

c. Leave the entire field blank if no capabilities are listed on the Data Collection Form.

EXAMPLE: STY

COLUMN 58 (BLANK)

COLUMNS 59-62 (DEPARTMENT)

a. If the room is classified as Academic or Laboratory enter the Department abbreviation directly from the Data Collection Form.

b. Leave blank for all other classifications.

COLUMN 63 (DEPARTMENT USE)

a. Enter a number code from the following table to indicate department use:

CODE	USE
1	OFFICE
2	SPEC CLRM & LAB
3	STORAGE
4	DEPT CONF & REF
5	STU-FAC RSCH LAB
6	STUDENT STUDY
7	DEPT SUPPORT ACT
8	ACCESSORY

b. Leave blank for all other classifications.

COLUMNS 64-80 (BLANK)

3. File Updating Format

This section contains instructions for formatting a file update record.

a. File Access

In order to gain access to the master file it is required that the first record be of the following form. Starting in column 10 put the word UPDATE followed by 5 blanks followed by the word BY followed by a blank followed by the last name of the persons making the update.

EXAMPLE: UPDATE BY ARNOLD

b. Record Insert

Prepare the record as an original and indicate that it is a record to be inserted in the Master File by entering the letter I in column 80 of the card.

c. Record Deletion

Prepare columns 1-8 as an original, leaving columns 9-79 blank. Enter the letter D in column 80 of the card to indicate the record is to delete from the Master File.

d. Record Update

Prepare columns 1-8 as above. Enter the data for updating in columns as if preparing an original record, leaving those columns blank where data on

the Master File is to remain unchanged. Enter the letter U in column 80 of the card to indicate that the Master File record is to be updated.

C. CLASSROOM AND LABORATORY USAGE

This section contains record format, preparation instructions, and file update format for all records to be included in the Classroom and Laboratory Usage Data Bank.

1. Data Record Format

See Figure 9.

2. Preparation Instructions

This section provides instructions for formatting each data item found on the Classroom and Laboratory Usage Data Collection Form (Figure 6). The space numbered "1" on the data record format refers to the left most similarly numbered column on the standard keypunch coding form and the standard IBM computer card.

COLUMNS 1-5 (ROOM NUMBER)

a. Enter this number directly from the Data Collection Form.

COLUMN 6 (USAGE CODE)

a. Enter a letter code from the following table to indicate how the room is being used:

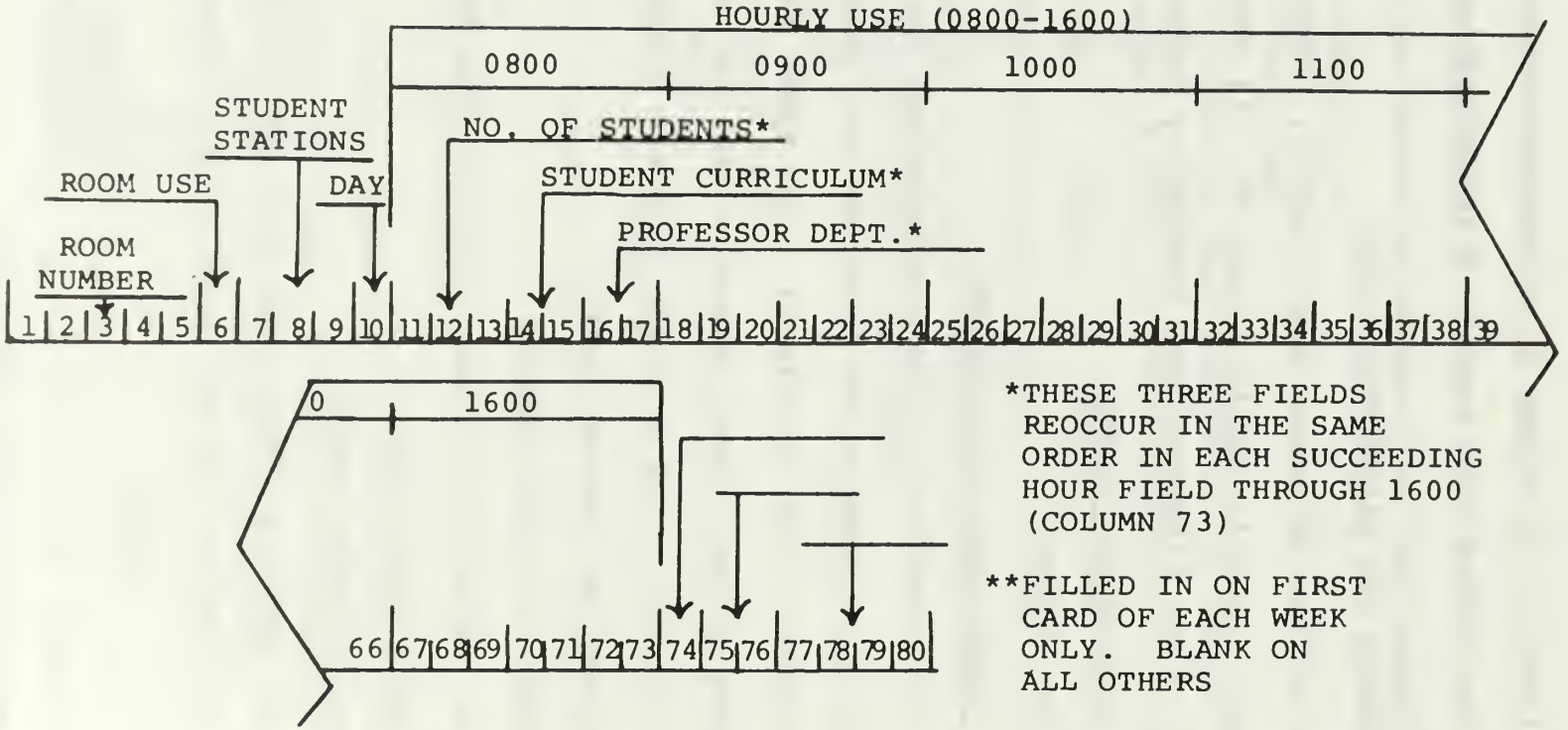
CODE	USE
C	CLASSROOM
L	LABORATORY

COLUMNS 7-9 (STUDENT STATIONS)

a. Enter as a 3 digit number the student stations from the Data Collection Form.

DATA RECORD FORMAT

(CLASSROOM AND LABORATORY USAGE)


HOURLY USE (0800-1600)
0800
0900
1000
1100
STUDENT STATIONS
NO. OF STUDENTS*
ROOM USE
DAY
STUDENT CURRICULUM*
PROFESSOR DEPT.*
ROOM NUMBER
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39
0
1600
66 67 68 69 70 71 72 73 74 75 76 77 78 79 80
*THESE THREE FIELDS REOCCUR IN THE SAME ORDER IN EACH SUCCEEDING HOUR FIELD THROUGH 1600 (COLUMN 73)
**FILLED IN ON FIRST CARD OF EACH WEEK ONLY. BLANK ON ALL OTHERS

- Figure 9

COLUMN 10 (DAY)

a. Enter a number code to identify the day of the week from the following table:

CODE	DAY
1	MONDAY
2	TUESDAY
3	WEDNESDAY
4	THURSDAY
5	FRIDAY

COLUMNS 11-73 (HOURLY DATA (0800-1600))

a. The columns are broken down by hour into 9 groups of 7 columns each as follows:

COLUMNS	HOUR
11-17	0800
18-24	0900
25-31	1000
32-38	1100
39-45	1200
46-52	1300
53-59	1400
60-66	1500
67-73	1600

1. Enter in the first 3 columns of each hourly group a 3 digit number indicating the number of students scheduled in the room for that day and hour. If the room is not scheduled enter 3 zeroes (000).

2. Enter in the next 2 columns of each hourly group the curriculum directly from the Data Collection Form.

3. Enter in the last 2 columns of each hourly group the department directly from the Data Collection Form.

EXAMPLE OF A 7 COLUMN GROUP: 025CSMA

COLUMNS 74-76 (QUARTER AND YEAR)

a. Use these columns on the first card (MONDAY) of each week only.

b. Enter the quarter for which the data applies as follows:

ENTRY	QUARTER
1	I
2	II
3	III
4	IV

c. Enter the last 2 digits of the academic year for which the data applies.

EXAMPLE: 469

COLUMNS 77-80 (FIRST CARD OF EACH WEEK)

COLUMNS 74-80 (REMAINING 4 CARDS OF EACH WEEK)

a. Leave Blank

SPECIAL GROUP DELINEATOR: Each 5 record weekly group must be followed by a single record with a $ in column 1 and the remaining 79 columns blank.

3. File Updating Format

This section contains instruction for formatting a file update record. This procedure is used to update the file between the quarterly recreations as a new schedule is implemented.

a. File Access

In order to gain access to the master file it is required that the first record be of the following form. Starting in column 10 put the word UPDATE followed by 5 blanks followed by the word

BY followed by a blank followed by the last name of the persons making the update.

EXAMPLE: UPDATE BY ARNOLD

b. Record Insert

Prepare the record as an original and indicate that it is a record to be inserted in the Master File by entering the letter I in column 80 of the card.

c. Record Delete

Prepare columns 1-10 as an original, leaving columns 11-79 blank. Enter the letter D in column 80 of the card to indicate the record is to be deleted from the Master File.

d. Record Update

Prepare columns 1-10 as above. Enter the data for updating in columns as if preparing an original record, leaving the columns blank where data on the Master File record is to remain unchanged. Enter the letter U in column 80 to indicate that the Master File record is to be updated.

III. DATA PROCESSING

This section contains recommended procedures for the implementation of the data processing programs, the heart of the BASIS. These programs are capable of checking input data for keypunching errors and printing error messages, initializing the master file tapes for each of the three data banks, updating each master file, printing special listings, and most importantly, printing in edited format the data stored on the master file tapes.

A. PROGRAMS AVAILABLE

The programs listed in this section were compatable with and run on the NPGS Computer Facility IBM 360/67 as of May, 1969. They are held by the NPGS Plans Officer. Sample output from each program is presented in Section IV of this manual. The programs are:

1) Public Quarters: There are two programs available to process public quarters data and provide error-free and edited output. They differ only in Job Control Language (JCL) and program Data Control Blocks (DCB). These differences allow processing and error checking of data input from a card deck while the other performs the same function on master file tape input.

2) NPGS Buildings and Spaces: There are two programs available to process building and spaces data and provide error free and edited output. They differ by and perform the same function on this data as program 1) does on quarters data.

3) Classroom and Laboratory Usage: There are two programs available to process usage data and provide error free and edited output. They differ in JCL and DCB as described above. In addition, the

program that accepts master file tape input, writes on two separate tapes the empty room data and the historical load factor data.

4) Master File Initialization: This program transfers data for the three programs listed above from cards to tape which serves to initialize the Master File for that data bank.

5) Master File Maintenance: This program performs record insertion, deletion, and updating from a card input.

6) Empty Room: This program edits and prints from a sorted tape input a list of empty classrooms and laboratories by hour, day of the week, and room size.

7) Historical Load Factor: This program edits and prints from tape input a quarterly list of all classrooms and laboratories with their load factor.

B. RECOMMENDED IMPLEMENTATION STEPS

The following basic procedures must be followed in order to implement one or all of the BASIS programs listed above.

1. General Guidelines

a. When implementing any of the processing programs using data punched on cards, it is necessary that all cards be in ascending numerical order or alphabetical order. This can be done mechanically on the NPGS Computer Facility's card sorter or with the IBM SORT procedure available with the System 360.

b. Contact the NPGS Computer Facility to arrange for an Applications Programmer to check all Job Control Language (JCL) cards provided with the programs. He will insure that all necessary cards are present and that no system changes have made the JCL obsolete since its

preparation in May, 1969. Maximum use should be made of the Applications Programmer, since he will be intimately familiar with the operational procedures of the Computer Facility.

2. Specific Program Guidelines

The following rules are intended to provide specific guidelines for the activation of each program with the assistance of an Applications Program.

a. Public Quarters

(1) Data Card Deck Organization. Organize the input data card deck in the following manner:

1) Arrange the data cards in alphabetical order by street name and in ascending numerical order by house number within a street name. This may be done on the card sorter or with the SORT Procedure.

2) Insure that the last data card is blank except for the word "UPDATE" beginning in column 10.

3) Check the data deck to insure that it is complete, i.e., contains a card for set of public quarters.

4) Ask the Applications Programmer to review the entire deck for overall correctness prior to submission for processing.

5) Submit the program for processing.

(2) Error Checking. A sample of the output that can be expected from the card deck input is illustrated in Section IV of this appendix. The error messages indicate the data card and the columns on the card that have been mispunched. To correct the errors:

1) Correct the mispunched cards by referring to the instructions in Sections I & II of this appendix.

2) Resubmit the program for processing and continue to correct as above and resubmit until all errors have been eliminated.

(3) Master File Initialization. Initialize the master file for this data bank by:

1) Processing the error-free data deck with the tape load program provided.

2) Process the master file at least once to obtain a copy of the edited report illustrated in Section IV of this appendix.

(4) Master File Update. Update the master file by:

1) Batching the changes until either at least 25 have been accumulated or an updated copy of the report is required.

2) Sort the update cards into the same order as the master file.

3) Process sorted update file and the master file using the program illustrated in the section immediately following this appendix.

4) To maintain master file integrity the update program requires that the first card in the update deck be prepared as explained in Section II of this appendix. The update program automatically computes a new update number and records the name of the person making the update. To take full advantage of this master file safeguard the person supervising the file maintenance should maintain a record of all updates for comparison with recorded data.

b. NPGS Building and Spaces

(1) Data Card Deck Organization. Organize the input data card deck in the following manner:

1) The procedures required to process the NPGS Building and Spaces data deck are identical to those of the Public Quarters deck except the cards must be in ascending numerical order by building number and by room number within a building.

(2) Error Checking. Follow the procedures described for the Public Quarters deck.

(3) Master File Initialization. Follow the procedures described for the Public Quarters initialization.

(4) Master File Maintenance. Follow the procedures described for the Public Quarters file maintenance.

c. Classroom and Laboratory Usage.

(1) Data Card Deck Organization. Organize the input data card deck in the same way that the Public Quarters deck is organized with the following exceptions:

1) Each room must be represented by a group of 5 data cards.

2) The 5 cards must be in Monday through Friday order.

3) The groups of cards must be in alphabetical order by building name abbreviation and ascending numerical order by room number within a building.

4) Each group of cards must be separated by a delimitor ($) card.

(2) Error Checking. Follow the procedures described for the Public Quarters deck.

(3) Master File Initialization. Follow the same procedures described for the Public Quarters

initialization. Processing the master file produces two additional files which must be processed as follows:

1) Sort the empty room tape by use (classroom or laboratory), day, hour and student stations.

2) Process the sorted empty room tape using the Empty Room program illustrated in the listings immediately following the appendix. The resulting report is shown in Section IV of this appendix.

3) Process the load factor tape using the Historical Load Factor program illustrated in the listings immediately following this appendix. The resulting report is shown in Section IV of this appendix.

(4) Master File Maintenance. This file is completely recreated at the beginning of each quarter so it is possible that file updating may not be necessary. If file updating is necessary follow the procedures described for the Public Quarters file maintenance observing that:

1) It is necessary only to update the card(s) of a particular weekly group that require updating and not the entire group of 5.

2) It is not necessary to separate the cards by the delimitor ($).

For a better understanding of this system or to answer any further questions concerning the system, obtain a copy of the thesis of which this Users Manual is Appendix B. The thesis is entitled "The Preparation of a Building and Spaces Data Bank at the Naval Postgraduate School" and is available at the NPGS library or from the NPGS Plans Officer.

IV. SAMPLE REPORTS

A. Public Quarters (without errors)

Street	House Number	Stories	Gross Area	Bedrooms	Baths	Basic_Equip.	Type	Yr. Const.	Auto_Storage	Cat Code
BERGIN	375A	2	2900	3	2/1	STOVE, REF, DISP	SEMIDETACH,OTHER	65	PARKING ONLY	711-26/0920
BERGIN	375B	2	2900	3	2/1	STOVE, REF, DISP	SEMIDETACH,OTHER	65	PARKING ONLY	711-26/0920
BERGIN	375C	2	2900	3	2/1	STOVE, REF, DISP	SEMIDETACH,OTHER	65	PARKING ONLY	711-26/0920
BERGIN	375D	2	2900	3	2/1	STOVE, REF, DISP	SEMIDETACH,OTHER	65	PARKING ONLY	711-26/0920
BERGIN	375E	2	2900	3	2/1	STOVE, REF, DISP	SEMIDETACH,OTHER	65	PARKING ONLY	711-26/0920
BERGIN	376A	2	2900	3	2/1	STOVE, REF, DISP	SEMIDETACH,OTHER	65	PARKING ONLY	711-26/0920
BERGIN	376B	2	2900	3	2/1	STOVE, REF, DISP	SEMIDETACH,OTHER	65	PARKING ONLY	711-26/0920
BERGIN	376C	2	2900	3	2/1	STOVE, REF, DISP	SEMIDETACH,OTHER	65	PARKING ONLY	711-26/0920
BERGIN	376D	2	2900	3	2/1	STOVE, REF, DISP	SEMIDETACH,OTHER	65	PARKING ONLY	711-26/0920
BERGIN	384A	2	2900	3	2/1	STOVE, REF, DISP	SEMIDETACH,OTHER	65	PARKING ONLY	711-26/0920
BERGIN	384B	2	2900	3	2/1	STOVE, REF, DISP	SEMIDETACH,OTHER	65	PARKING ONLY	711-26/0920
BERGIN	384C	2	2900	3	2/1	STOVE, REF, DISP	SEMIDETACH,OTHER	65	PARKING ONLY	711-26/0920
BERGIN	384D	2	2900	3	2/1	STOVE, REF, DISP	SEMIDETACH,OTHER	65	PARKING ONLY	711-26/0920
BERGIN	384E	2	2900	3	2/1	STOVE, REF, DISP	SEMIDETACH,OTHER	65	PARKING ONLY	711-26/0920
GILLESPIE	1	1	3000	3	0/2	STOVE, REF, DISP	SEMIDETACH,MASONRY	64	ATTACHED CARPORT	711-27/0920
GILLESPIE	2	1	3000	3	0/2	STOVE, REF, DISP	SEMIDETACH,MASONRY	64	ATTACHED CARPORT	711-27/0920
GILLESPIE	3	1	3000	3	0/2	STOVE, REF, DISP	SEMIDETACH,MASONRY	64	ATTACHED CARPORT	711-27/0920
GILLESPIE	4	1	3000	3	0/2	STOVE, REF, DISP	SEMIDETACH,MASONRY	64	ATTACHED CARPORT	711-27/0920
GILLESPIE	5	1	3000	3	0/2	STOVE, REF, DISP	SEMIDETACH,MASONRY	64	ATTACHED CARPORT	711-27/0920
GILLESPIE	6	1	3000	3	0/2	STOVE, REF, DISP	SEMIDETACH,MASONRY	64	ATTACHED CARPORT	711-27/0920
HALSEY	1060	1	2800	3	1/1	STOVE & REFRIG	SEMIDETACH,ATTACHED	49	DETACHED CARPORT	711-21/0920
HALSEY	1061	1	2800	3	1/1	STOVE & REFRIG	SEMIDETACH,ATTACHED	49	DETACHED CARPORT	711-21/0920
HALSEY	1062	1	2800	3	1/1	STOVE & REFRIG	SEMIDETACH,ATTACHED	49	DETACHED CARPORT	711-21/0920
HALSEY	1063	1	2800	3	1/1	STOVE & REFRIG	SEMIDETACH,ATTACHED	49	DETACHED CARPORT	711-21/0920
HALSEY	1064	1	2800	3	1/1	STOVE & REFRIG	SEMIDETACH,ATTACHED	49	DETACHED CARPORT	711-21/0920
HALSEY	1065	1	2800	3	1/1	STOVE & REFRIG	SEMIDETACH,ATTACHED	49	DETACHED CARPORT	711-21/0920
HALSEY	1066	1	2800	3	1/1	STOVE & REFRIG	SEMIDETACH,ATTACHED	49	DETACHED CARPORT	711-21/0920
HALSEY	1067	1	2800	3	1/1	STOVE & REFRIG	SEMIDETACH,ATTACHED	49	DETACHED CARPORT	711-21/0920
HALSEY	1068	1	2800	3	1/1	STOVE & REFRIG	SEMIDETACH,ATTACHED	49	DETACHED CARPORT	711-21/0920
HALSEY	1069	1	2800	3	1/1	STOVE & REFRIG	SEMIDETACH,ATTACHED	49	DETACHED CARPORT	711-21/0920

B. Public Quarters (with errors)

STREET	HOUSE NUMBER	STORIES	GROSS APPRAISE	BEDROOMS	BATHS HALF/FULL	BASIC EQUIP.	TYPE	YR CONSI.	AUTO STORAGE	CAT & CODE TABLE CODE
MERVINE	9	1	2900	3	1/1	STOVE, REF, DISP	SEMIDETACH,STUCCO	63	ATTACHED CARPORT	711-27/0920
MERVINE	10	1	2900	3	1/1	STOVE, REF, DISP	SEMIDETACH,STUCCO	63	ATTACHED CARPORT	711-27/0920
MERVINE	11	1	2900	3	1/1	STOVE, REF, DISP	SEMIDETACH,STUCCO	63	ATTACHED CARPORT	711-27/0920
MERVINE	12	1	2900	3	1/1	REFRIG	*****,AILERS		STUCCO OTHER	/
********CARD FOR ABOVE DWELLING MISPUNCHED IN COLUMN(S)								23 THRU 24 25 26 THRU 27 28 29 THRU 38 *****		
MERVINE	13	1	2900	3	1/1	STOVE, REF, DISP	SEMIDETACH,STUCCO	63	ATTACHED CARPORT	711-27/0920
MERVINE	14	1	2900	3	1/1	STOVE, REF, DISP	SEMIDETACH,STUCCO	63	ATTACHED CARPORT	711-27/0920
MERVINE	15	1	2900	3	1/1	STOVE, REF, DISP	SEMIDETACH,STUCCO	63	ATTACHED CARPORT	711-27/0920
MERVINE	16	1	2900	3	1/1	STOVE, REF, DISP	SEMIDETACH,STUCCO	63	ATTACHED CARPORT	711-27/0920
MERVINE	17	1	2900	3	1/1	STOVE, REF, DISP	SEMIDETACH,STUCCO	63	ATTACHED CARPORT	711-27/0920
MERVINE	18	1	2900	3	1/1	STOVE, REF, DISP	SEMIDETACH,STUCCO	63	ATTACHED CARPORT	711-27/0920
MERVINE	19	1	2900	3	1/1	STOVE, REF, DISP	SEMIDETACH,STUCCO	63	ATTACHED CARPORT	711-27/0920
NPGS	QTRC	1	3300	4	1/2	STOVE & REFRIG	DUPLEX ,MASONRY	39	DETACHED GARAGE	711-40/0920
NPGS	QTRD	1	3300	4	1/2	STOVE & REFRIG	DUPLEX ,MASONRY	39	DETACHED GARAGE	711-40/0920
NPGS	QTRE	1	3300	4	1/2	STOVE & REFRIG	DUPLEX ,MASONRY	39	DETACHED GARAGE	711-40/0920
NPGS	QTRF	1	3300	4	1/2	STOVE & REFRIG	APARTMENT ,MASONRY	39	DETACHED GARAGE	711-40/0920
********CARD FOR ABOVE DWELLING MISPUNCHED IN COLUMN(S)								25		*****
NPGS	QTRG	1	3300	4	1/2	STOVE & REFRIG	DUPLEX ,MASONRY	39	DETACHED GARAGE	711-40/0920
RICKETTS	399A	2	2910	3	2/1	STOVE, REF, DISP	SEMIDETACH,OTHER	65	PARKING ONLY	711-26/0920
RICKETTS	399B	2	2910	3	2/1	STOVE, REF, DISP	SEMIDETACH,OTHER	65	PARKING ONLY	711-26/0920
RICKETTS	399C	2	2910	3	2/1	STOVE, REF, DISP	SEMIDETACH,OTHER	65	PARKING ONLY	711-26/0920
RICKETTS	399E	2	2910	3	2/1	STOVE, REF, DISP	SEMIDETACH,OTHER	65	PARKING ONLY	711-26/0920
RICKETTS	399F	2	2910	3	2/1	STOVE, REF, DISP	SEMIDETACH,OTHER	65	PARKING ONLY	711-26/0920
SHUBRICK	101	1	2800	3	1/1	STOVE, REF, DISP	SEMIDETACH,MASONRY	63	ATTACHED CARPORT	711-25/0920
SHUBRICK	102	1	2800	3	1/1	STOVE, REF, DISP	SEMIDETACH,MASONRY	63	ATTACHED CARPORT	711-25/0920
********CARD FOR ABOVE DWELLING MISPUNCHED IN COLUMN(S)										29 THRU 38 *****
SHUBRICK	103	1	2800	3	1/1	STOVE, REF, DISP	SEMIDETACH,MASONRY	63	ATTACHED CARPORT	711-25/0920
SHUBRICK	104	1	2800	3	1/1	STOVE, REF, DISP	SEMIDETACH,MASONRY	63	ATTACHED CARPORT	711-25/0920
SHUBRICK	105	1	2800	3	1/1	STOVE, REF, DISP	SEMIDETACH,MASONRY	63	ATTACHED CARPORT	711-25/0920
SHUBRICK	106	1	2800	3	1/1	STOVE, REF, DISP	SEMIDETACH,MASONRY	63	ATTACHED CARPORT	711-25/0920
SHUBRICK	107	1	2800	3	1/1	STOVE, REF, DISP	SEMIDETACH,MASONRY	63	ATTACHED CARPORT	711-25/0920
SHUBRICK	108	1	2800	3	1/1	STOVE, REF, DISP	SEMIDETACH,MASONRY	63	ATTACHED CARPORT	711-25/0920
SHUBRICK	109	1	2800	3	1/1	STOVE, REF, DISP	SEMIDETACH,MASONRY	63	ATTACHED CARPORT	711-25/0920

C. NPGS Building And Spaces (without errors)

BUILDING NUMBER	SPACE NUMBER	SIZE (FT.)	AREA (SQ. FT.)	CAT. CODE (NEW CODE)	DMS CLASS.	STA-TIONS	C-A-P-A-B-I-L-I-T-I-E-S DC POWER	AC POWER	OTHER	DEPT.	DEPT. USE
234	H153A	025.4 030.3	000769.6	171-10 (0210)	LABITORY	015	120V 60C 3PH 220V 60C 3PH			AERO	SEE USAGE DATA
235	R11C	055.8 020.C	001196.C	740-76 (0430)	SERVICE	075	120V 60C 3PH 220V 60C 3PH			LIBRARY	
235	R127	C30.C C35.E	001065.C	171-10 (0210)	LABITORY	030	120V 60C 3PH			METR	SEE USAGE DATA
235	R25C	C20.0 C19.8	000396.C	171-10 (0310)	ACADEMIC	020	120V 60C 3PH			AERO	STORAGE
240	I24C	025.C 020.C	000522.E	171-10 (0115)	ACADEMIC	020	120V 60C 3PH			MATH	STUDENT STUDY
450		123.4 05C.C	006281.1	740-40 (0500)	SERVICE	NA	120V 60C 3PH 220V 60C 3PH		H. WATER C. WATER	BOWLING ALLEY	
470		095.5 071.1	006790.1	530-20 (0000)	TENANT	NA	120V 60C 3PH 220V 60C 3PH		H. WATER C. WATER	FLEET NUM. WEATHER CENTER	
500		045.1 050.4	002273.C	171-10 (0210)	ACADEMIC	012	120V 60C 1PH 120V 60C 3PH 220V 60C 3PH 440V 60C 3PH 120V 400C 2PH 120V 400C 3PH	28V 120V 25CV 4CCV 500V 2CCOV BAT.125V	GAS COMP AIR VACUUM H. WATER C. WATER SEAWATER CC TV SOUND SCREEN	MENG	SPEC CLRM & LAB

D. NPGS Building And Spaces (with errors)

BUILDING NUMBER	SPACE NUMBER	SIZE (FT.)	AREA (SQ. FT.)	CAT. CODE (NEW CODE)	RMS CLASS.	STA-TIONS	C-A-P-A-B-I-L-I-T-I-E-S DC POWER	AC POWER	OTHER	DEPT.	DEPT. USE
138		220.1 090.6	019941.1	740-90 (0520)	SERVICE	NA	120V 60C 3PH 220V 60C 3PH		H. WATER C. WATER	INVALID CATEGORY CODE	
220	340	C19.8 C1[illegible].7	00031C.[illegible]	724-10 (0910)	SERVICE	002	120V 60C 3PH			BOO WITH MESS	
232	S100	C19.C C19.7	000374.3	171-10 (0310)	ACADEMIC	003	120V 60C 3PH			PHYS	CFFICE
aaaaaaaCARD FOR ABOVE SPACE MISPUNCHED IN COLUMN(S)							4 THRU 9				aaaaaaa
******THIS IS A BAD DATA CARD: 232S101 00.70200171-100115ANA BC									PHYS8		
******THIS IS A BAD DATA CARD: S117 02380240171-100110C065B							JKLMNPR				
232	S432	041.C C45.8	001919.0	171-10 (0210)	LAB'TORY	032	120V 60C 1PH 120V 60C 3PH 220V 60C 3PH 440V 60C 3PH 120V 400C 2PH 120V 400C 3PH	28V 120V 250V 400V 500V 2000V BAT.125V		EENG	SEE USAGE DATA
232	S433	028.3 025.6	000724.5	171-10 (0215)	ACADEMIC	NA	120V 60C 3PH			EENG	SOUND SCREEN
aaaaaaaCARD FOR ABOVE SPACE MISPUNCHED IN COLUMN(S)											63 aaaaaaa
234	H123	C15.9 C1C.8	000171.7	171-10 (0720)	ACADEMIC	NA	120V 60C 3PH 220V 60C 3PH			MENG	DEPT SUPPORT ACT

E. Classroom And Laboratory Usage (Without Errors)

EXAMPLE

```
                                                    0900
                  # OF STUDENTS---+==25  0.50=+---LOAD FACTOR
STUDENTS CURRICULUM---+-CS___CS____+--PROFESSORS DEPT.
```

*****B111 LABORATOR C25 STUDENT STATIONS*****

	0800	0900	1000	1100	1200	1300	1400	1500	1600	DAILY LE
MON	013 0.72 EE EE	013 0.72 EE EE	013 0.72 EE EE			010 0.40 AE EE	010 0.40 AE EE	010 0.40 AE EE		0 .37
TUE			012 0.48 EE EE	012 0.48 EE EE		013 0.52 EE EE	015 0.60 EE EE	015 0.60 EE EE		0 .29
WED	013 0.72 EE EE	013 0.72 EE EE	013 0.72 EE EE			010 0.40 AE EE	010 0.40 AE EE	010 0.40 AE EE		0 .37
THU			012 0.48 EE EE	012 0.48 EE EE		013 0.52 EE EE	015 0.60 EE EE	015 0.60 EE EE		0 .29
FRI	013 0.72 EE EE	013 0.72 EE EE	013 0.72 EE EE			010 0.40 AE EE	010 0.40 AE EE	010 0.40 AE EE		0 .37

QUARTERLY LE=00.33

@@@@@@@@@B230 Y LESS THAN 5 DATA CARDS FOR THIS ROOM@@@@@@@@@@

*****B230 CLASSROOM C40 STUDENT STATIONS*****

	0800	0900	1000	1100	1200	1300	1400	1500	1600	DAILY LE
MON	025 0.42 OA OA	020 0.50 CS CS		030 0.75 CS MA	015 0.37 OC OC	040 1.00 CS CS	030 0.75 EE EE	010 0.25 ME ME	020 0.50 CH CH	0 .52
TUE	025 0.42 CS MA	017 0.42 OC OC		023 0.57 EE EE	035 0.50 ME ME		030 0.75 EE EE			0 .36
WED	025 0.42 OA OA	020 0.50 CS CS		030 0.75 CS MA	015 0.37 OC OC	040 1.00 CS CS	030 0.75 EE EE	010 0.25 ME ME	020 0.50 CH CH	0 .52
@@@@@@@INVALID ALPHABETIC FIELD IN THIS DEC@@@@@@@										
THU	025 0.42 OA OA	020 0.50 CS CS		030 0.75 CS MA	015 0.37 OC OC	040 1.00 CS CS	030 0.75 EE EE	010 0.25 ME ME	020 0.50 CH CH	0 .52
FRI	025 0.42 OA OA	020 0.50 CS CS		030 0.75 CS MA	015 0.37 OC OC	040 1.00 CS CS	030 0.75 EE EE	010 0.25 ME ME	020 0.50 CH CH	0 .52

QUARTERLY LE=00.48

F. Classroom And Laboratory Usage (with errors)

EXAMPLE

```
                                    0800
                  # OF STUDENTS--+--25  0.50=+---LOAD FACTOR
STUDENTS CURRICULUM--+-CS   CS---+--PROFESSORS DEPT.
```

*****R250 CLASSROOM 030 STUDENT STATIONS*****

	0800	0900	1000	1100	1200	1300	1400	1500	1600	DAILY LF
MON		020 0.66 ME ME	018 0.63 BS MA	017 0.56 CH MA		021 0.70 OC OC	013 0.43 MT MA			0 .33
TUE	015 0.50 AE MA	020 0.66 ME ME		020 0.66 MT MT			013 0.43 MT MA			0 .25
WED		015 0.50 AE MA	018 0.63 BS MA	017 0.56 CH MA						0 .18
THU	015 0.50 AE MA		020 0.66 MT MT	017 0.56 CH MA		021 0.70 OC OC	013 0.43 MT MA			0 .31
FRI		020 0.66 ME ME	018 0.63 BS MA	020 0.66 MT MT		021 0.70 OC OC	013 0.43 MT MA			0 .34

QUARTERLY LF=00.28

*****S117 CLASSROOM 076 STUDENT STATIONS*****

	0800	0900	1000	1100	1200	1300	1400	1500	1600	DAILY LF
MON	050 0.65 CS CS		041 0.53 ME ME	031 0.40 ES MA		030 0.78 BS MA				0 .26
TUE	050 0.65 CS CS		041 0.53 ME ME	031 0.40 ES MA		030 0.78 BS MA				0 .26
WED	050 0.65 CS CS		041 0.53 ME ME	031 0.40 ES MA		030 0.78 BS MA				0 .26
THU	050 0.65 CS CS		041 0.53 ME ME	031 0.40 ES MA		030 0.78 BS MA				0 .26
FRI	050 0.65 CS CS		041 0.53 ME ME	031 0.40 ES MA		030 0.78 BS MA				0 .26

QUARTERLY LF=00.26

*****S350 LABORATOR 015 STUDENT STATIONS*****

	0900	0900	1000	1100	1200	1300	1400	1500	1600	DAILY LF
MON			CC5 0.33 CH CH	005 0.33 CH CH						0 .07
TUE			CC5 0.33 CH CH	005 0.33 CH CH						0 .07
WED			CC5 0.33 CH CH	005 0.33 CH CH						0 .07
THU			CC5 0.33 CH CH	005 0.33 CH CH						0 .07
FRI			CC5 0.33 CH CH	005 0.33 CH CH						0 .07

QUARTERLY LF=00.07

G. Empty Room

LIST OF EMPTY CLASSROOMS

ROOM	STATIONS
MONDAY	0800
S221	0300
S223	0300
R240	0350
R111	0400
S117	0650
MONDAY	0900
S222	0210
I325	0250
I225	0250
S325	0300
R240	0350
S425	0350
R111	0400
S435	0400
I260	0530
S117	0650
MONDAY	1000
R210	0150
H241	0150
B123	0200
S223	0210
I345	0290
R280	0300
R113	0400
I260	0530
MONDAY	1100
R235	0250
R260	0300
S245	0300
S325	0300
S425	0350
R113	0400
MONDAY	1200
R216	0200
R218	0200
S223	0210
S223	0210
I135	0250
I225	0250
I335	0250
I360	0250
I145	0300
I150	0300
I225	0300

II. Historical Load Factor

HISTORICAL LOAD FACTOR DATA FOR QUARTER 4 '69

B10C	0.44	LABORATOR
B104	0.49	CLASSROOM
B112	0.61	LABORATOR
B125	0.83	LABORATOR
B201	0.60	LABORATOR
B202	0.55	CLASSROOM
B208	0.20	LABORATOR
B209	0.55	CLASSROOM
B215	0.62	CLASSROOM
H033	0.30	LABORATOR
H109	0.45	CLASSROOM
H121	0.63	CLASSROOM
H125	0.60	CLASSROOM
H221	0.45	CLASSROOM
H222	0.53	CLASSROOM
H223	0.39	CLASSROOM
S107	0.35	LABORATOR
S111	0.40	LABORATOR
S127	0.46	LABORATOR
S136	0.51	CLASSROOM
S138	0.45	CLASSROOM
S141	0.55	LABORATOR
S223	0.29	LABORATOR
S226	0.53	CLASSROOM
S230	0.53	CLASSROOM
S231	0.54	CLASSROOM
S242	0.65	LABORATOR
S249	0.60	CLASSROOM
S307	0.56	LABORATOR
S310	0.45	CLASSROOM

I. File Maintenance

THE FOLLOWING RECORDS WERE ALTERED BY BUILDING & SPACES MASTER FILE UPDATE
D=RECORD DELETED I=RECORD INSERTED U=RECORD UPDATED

202S2C5	C4520412171-1C130CA012ABC	JKLM	STUVW	AERO2	D
202R210	04520412171-10130CC012ABC	JKLM	STUVW	AERO2	
202R210	04520412171-101300C012ABC	JKLMN	STUVW	AERO2	U
202R230	04520412171-1C1300E012ABC	JKLM	STUVW		
202R23C	C2020202171-1C1300E006ABC	JKLM	STUVW		U
202R230A	025C0210171-1C1300E006ABC	JK	STU		I
202R260	04520412171-101300C012ABC	JKLM	STUVW	AERO2	D
202R270	C4520412171-1C1300A012ABCDEF	JKLMNOPQR	STUVWXY	AERO2	
202R270	C4520412171-101300A012ABCDEF	JKLMNOPQR	STUVWXY	AERO3	U
22C	1234090574C-40C67CB006BD	MN			
22C	1234090574C-40067CB006BD	MNC			U
22CS432	15551229171-1C130CC012ABC	JKLM	STUVW	AERO2	D
2311347	APCDEFGHIJKLMNOPQRSTUVWXYZ				I
2311349	C4520412171-1C1300C012ABC	JKLM	STUVW	AERO2	
2311349	C4520412939-10C920CC12ABC	JKLM	STUVW	PHYS4	U
25CB111	C4520412740-331300B012ABC	JKLM	STUVW	EENG2	
25OB111	04520412740-33130CB012ABC	JKLMN	STUVWX	EENG2	U
25CB123	C4520412171-101300C012ABC	JKLM	STUVW	EENG2	D
260H025	C4520412850-401300B012ABC	JKLMN	STUVW	AERO2	I

UPDATE #01 BY ARNOLD

```
//    EXEC ASMALG,REGION.GO=100K,TIME.GO=2
//ASM.SYSIN DD *
*********************************************************************
*********************************************************************
****                                                             ****
**** THIS PROGRAM ACCEPTS INPUT FROM THE MASTER FILE TAPE,       ****
**** PERFORMS ERROR CHECKING, AND OUTPUTS ON THE PRINTER IN EDITED ****
**** FORMAT THE PUBLIC QUARTERS PORTION OF THE BUILDING AND SPACES ****
**** INFORMATION SYSTEM (BASIS)                                  ****
****                                                             ****
*********************************************************************
*********************************************************************
         PRINT NOGEN
NAME     CSECT
         USING     *,15
         SAVE      (14,12),T,*
         LR        12,13
         CNOP      0,4
         BAL       13,*+76
         DROP      15
         USING     *,13
         DS        18F
         ST        13,8(12)
         ST        12,4(13)
****
*
***INITIALIZE WORK AREAS, LOAD REGISTERS,SET SWITCHES, AND
***PRINT PAGE HEADINGS
*
****
NAME1    OPEN   (INPT,(INPUT),OUTPT,(OUTPUT))
NOW      LA     5,LOFO                LOAD ADDR OF OUTPUT WORK AREA IN R5
         LA     3,CARD                LOAD ADDR OF INPUT WORK AREA IN R5
         LA     11,30                 R11 ALLOWS 30 PRINTED LINES PER PG.
         PUT    OUTPT,LAMES1          PRINT HEADINGS
         PUT    OUTPT,LAMES2
         PUT    OUTPT,UNDER1
START    GET    INPT,(3)              READ FIRST CARD
         LR     3,1                   LOAD ADDR OF FIRST CARD IN R3
         CLC    10(6,3),=C'UPDATE'    CHECK FOR LAST CARD
         BC     8,FINI                BRANCH IF LAST CARD FOUND
         MVI    ERROR,X'00'           SET ERROR SWITCH TO OFF
         MVI    LOFO,C' '             CLEAR OUTPUT WORK AREA
         MVC    LOFO+1(132),LOFO
         MVI    0(5),C'0'             MOVE IN DOUBLE SPACE CHARACTER
```

```
****
*
***CHECK FOR THE ABSENCE OF STREET NAME OR HOUSE NUMBER
*
****
         CLC   0(9,3),=C'          ' IS STREET NAME MISSING?
         BC    8,BADCARD             BRANCH TO MISSING STREET NAME ROUT.
         CLC   9(5,3),=C'     '      IS HOUSE NUMBER MISSING?
         BC    8,BADCARD             BRANCH TO MISSING HOUSE # ROUT.


****
*
***CHECK FOR VALID CHARACTERS IN STREET NAME AND HOUSE NUMBER
***AND EDIT COLUMNS 1 THRU 14
*
****
         LA    2,9                   R2 IS LOOP COUNTER FOR BCT
         LR    6,3                   LOAD ADDR OF FIRST COLUMN IN R6
CHECK1   CLI   0(6),C' '             |
         BC    8,*+20                |
         CLI   0(6),C'A'             |   CHECK FOR BLANKS (VALID)
         BC    4,INVSTR              |   AND NUMBERS (INVALID)
         CLI   0(6),C'Z'             |
         BC    2,INVSTR              |
         LA    6,1(6)                LOAD R6 WITH ADDR OF NEXT COLUMN
         BCT   2,CHECK1              LOOP BACK TO CHECK2 IF R2 NE ZERO
PET1     MVC   1(9,5),0(3)           MOVE STREET NAME TO OUTPUT AREA
         LA    2,5                   LOAD  R2 FOR LOOP COUNTER FOR BCT
         LA    6,10(3)               LOAD R6 WITH BEGINNING ADDRESS
CHECK2   CLI   0(6),C' '             |
         BC    8,*+12                |   CHECK FOR BLANK (VALID), LETTER
         CLI   0(6),C'A'             |   (VALID), OR NUMBER (VALID)
         BC    4,INVHSE              |
         LA    6,1(6)                LOAD R6 WITH ADDR OF NEXT COLUMN
         BCT   2,CHECK2              LOOP BACK TO CHECK2 IF R2 NE ZERO
PET2     MVC   13(5,5),9(3)          MOVE HOUSE NUMBER TO OUTPUT AREA
****
*
***CHECK FOR NUMBERS IN COLUMNS 15 THRU 22 AND EDIT GROSS AREA, AND
***#OF STORIES, BEDROOMS, AND BATHS
*
****
         LA    2,8                   R2 IS LOOP COUNTER FOR BCT
         LA    6,14(3)               LOAD R6 WITH BEGINNING ADDRESS
CHECK3   CLI   0(6),C'0'             |   CHECK FOR NUMBER (VALID)
         BC    4,INVSTC              |
```

```
         LA    6,1(6)              LOAD R6 WITH ADDR OF NEXT COLUMN
         BCT   2,CHECK3            LOOP BACK TO CHECK3 IF R2 NE ZERO
RET3     MVC   23(1,5),14(3)       MOVE # OF STORIES TO OUTPUT AREA
         MVC   30(4,5),15(3)       MOVE GROSS AREA TO OUTPUT AREA
         MVC   42(1,5),19(3)       MOVE # OF BEDROOMS TO OUPPUT AREA
         MVC   52(1,5),20(3)       MOVE # OF FULL BATHS TO OUTPT AREA
         MVI   53(5),C'/'          INSERT SLASH
         MVC   54(1,5),21(3)       MOVE # OF HALF BATHS TO OUTPUT AREA
****
*
***CHECK FOR VALID CODE NUMBERS IN COLUMNS 23 AND 24 AND CONVERT TO
***BASIC EQUIPMENT AND BUILDING TYPE
*
****
         LA    2,2                 R2 IS LOOP COUNTER FOR BCT
         LA    6,22(3)             LOAD R6 WITH BEGINNING ADDRESS
CHECK4   CLI   0(6),C'1'          |
         BC    4,INVTYEQ           |  CHECK FOR NUMBER BETWEEN
         CLI   0(6),C'8'           |  1 AND 8 INCLUSIVE (VALID)
         BC    2,INVTYEQ           |
         LA    6,1(6)              LOAD R6 WITH ADDR OF NEXT COLUMN
         BCT   2,CHECK4            LOOP BACK TO CHECK4 IF R2 NE ZERO
RET4     LA    10,EQUIP-16         LOAD R10 WITH ADDR OF EQUIP TABLE-16
         NI    22(3),X'0F'         FIND WHICH TABLE ENTRY IS DESIRED
         SR    6,6                 ZERO R6
         IC    6,22(3)             INSERT RESULTING BINARY # IN R6
         SLL   6,4                 MULT THAT # BY 16 (TAB ENTRY LENGTH)
         AR    10,6                FIND CORRECT TABLE ENTRY ADDRESS
         MVC   58(16,5),0(10)      MOVE TABLE ENTRY TO OUTPUT AREA
         LA    10,TYPE2-8          LOAD R10 WITH ADDR OF TYPE2 TABLE-8
         NI    23(3),X'0F'         FIND WHICH TABLE ENTRY IS DESIRED
         SR    6,6                 ZERO R6
         IC    6,23(3)             INSERT RESULTING BINARY # IN R6
         SLL   6,3                 MULT THAT # BY 8 (TAB ENTRY LENGTH)
         AR    10,6                FIND CORRECT TABLE ENTRY ADDRESS
         MVC   88(8,5),0(10)       MOVE TABLE ENTRY TO OUTPUT AREA
         MVI   87(5),C','          INSERT COMMA IN NEXT SPACE
****
*
***CHECK FOR A VALID CODE NUMBER IN COLUMN 25 AND CONVERT TO CONSTRUCT-
***ION TYPE
*
****
         CLI   24(3),C' '          |
         BC    8,INVCON            |  CHECK FOR BLANK (INVALID)
         CLI   24(3),C'1'          |  OR NUMBERS BETWEEN 1 AND 6
         BC    4,INVCON            |  INCLUSIVE (VALID)
         CLI   24(3),C'6'          |
```

```
         BC    2,INVCCN                |
RET5     LA    10,TYPE1-10             LCAC R1C WITH ADCR OF TABLE TYPE1-10
         NI    24(3),X'0F'             FINC WHICH TABLE ENTRY IS DESIRED
         SR    6,6                     ZERC R6
         SR    9,9                     ZERC R9
         LA    7,10                    LCAC R7 WITH SIZE OF TABLE ENTRY
         IC    9,24(3)                 INSERT RESULTING BINARY # IN R9
         MR    6,9                     MULT THAT # BY 10 (TAB ENTRY LENGHT)
         AR    10,7                    R10 NCW HAS ENTRY ADDRESS
         MVC   77(10,5),0(10)          MCVE ENTRY TC CUTPLT AREA
****
*
***CHECK FCR VALIC NUMBERS IN CCLUMNS 26 AND 27 AND ECIT YEAR OF
***CCNSTRUCTICN
*
****
         LA    6,25(3)                 LOAC BEGINNING ADDR IN R6
         LA    2,2                     R2 IS LCOP COUNTER FCR BCT
CHECK5   CLI   0(6),C'0'               |   CHECK FOR NUMBER (VALID)
         BC    4,INVYR                 |
         LA    6,1(6)                  LOAC R6 WITH ADDR OF NEXT COLUMN
         BCT   2,CHECK5                LOCP BACK TO CHECK5 IF R2 NE ZERC
RET6     MVC   98(2,5),25(3)           MCVE YR OF CONST. TO OUTPUT AREA
****
*
***CHECK FCR A VALIC NUMBER IN CCLUMN 28 ANC CCNVERT TO PARKING AREA
***DESCRIPTICN
*
****
         CLI   27(3),C'1'              |
         BC    4,INVPK                 |   CHECK FCR NUMBERS BETWEEN
         CLI   27(3),C'6'              |   1 AND 6 INCLUSIVE (VALID)
         BC    2,INVPK                 |
RET7     LA    10,PARK-16              LCAC R10 WITH ADCR OF PARK TABLE-16
         NI    27(3),X'0F'             FINC WHICH TABLE ENTRY IS DESIRED
         SR    6,6                     ZERC R6
         IC    6,27(3)                 INSERT RESULTING BINARY # IN R6
         SLL   6,4                     MULT THAT # BY 16 (TAB ENTRY LENGTH)
         AR    10,6                    R10 NCW HAS ENTRY ADDRESS
         MVC   104(16,5),0(10)         MCVE ENTRY TO OUTPUT AREA
****
*
***CHECK FCR VALIC NUMBERS IN COLUMNS 29 THRU 38 ANC EDIT NAVY
***CATEGORY CCDE ANC FEW CODE
*
****
         LA    2,9                     R2 IS LCCP CCUNTER FOR BCT
         LA    6,28(3)                 LCAC R6 WITH BEGINNING ADDRESS
```

```
CHECK6   CLI   0(6),C'-'                  |
         BC    8,*+12                     |   CHECK FOR - OR NUMBER (VALID)
         CLI   0(6),C'0'                  |
         BC    4,INVCAT                   |
         LA    6,1(6)                     LOAD R6 WITH ADDR OF NEXT COLUMN
         BCT   2,CHECK6                   LOOP BACK TO CHECK6 IF R2 NE ZERO
RET8     MVC   121(6,5),28(3)             MOVE CATEGORY CODE TO OUPPUT AREA
         MVI   127(5),C'/'                INSERT SLASH
         MVC   128(4,5),34(3)             MOVE NEW CODE TO OUTPUT AREA
         PUT   OUTPT,LOFC                 PRINT LINE OF OUTPUT
         CLI   ERRCR,X'01'                IS ERROR SWITCH SET?
         BC    7,*+28                     BRANCH IF SWITCH OFF (NO ERROR)
         PUT   OUTPT,ERRMSG               PRINT ERROR MESSAGE
         MVI   ERRMSG+58,C' '             |   BLANK PART OF ERROR
         MVC   ERRMSG+59(69),ERRMSG+58    |   MESSAGE AREA
         BC    15,NEWH                    BRANCH TO CHECK # OF LINES OF OUTPUT
****
*
***ERROR ROUTINES
*
****
INVSTR   MVC   ERRMSG+58(9),=C'1 THRU 10'  |
         MVI   ERRCR,X'01'                 |
         BC    15,RET1                     |
INVHSE   MVC   ERRMSG+67(10),=C'10 THRU 14' |
         MVI   ERRCR,X'01'                 |
         MVI   ERRCR,X'01'                 |   THESE ROUTINES MOVE
         BC    15,RET2                     |   THE NUMBERS OF IN-
INVSTC   MVC   ERRMSG+78(10),=C'15 THRU 22' |   CORRECTLY PUNCHED
         MVI   ERRCR,X'01'                 |   DATA CARD COL TO THE
         BC    15,RET3                     |   ERROR MESSAGE, SET
INVTYEQ  MVC   ERRMSG+89(10),=C'23 THRU 24' |   THE ERROR SWITCH TO
         MVI   ERRCR,X'01'                 |   TO ON, AND RETURN TO
         BC    15,RET4                     |   CHECKING AND EDITING
INVCCN   MVC   ERRMSG+100(2),=C'25'        |   THE INPUT DATA CARD
         MVI   ERRCR,X'01'                 |
         BC    15,RET5                     |
INVYR    MVC   ERRMSG+103(10),=C'26 THRU 27' |
         MVI   ERRCR,X'01'                 |
         BC    15,RET6                     |
INVPK    MVC   ERRMSG+114(2),=C'28'        |
         MVI   ERRCR,X'01'                 |
         BC    15,RET7                     |
INVCAT   MVC   ERRMSG+117(10),=C'29 THRU 38' |
         MVI   ERRCR,X'01'                 |
         BC    15,RET8                     |
BADCARD  MVC   1(30,5),=C'******THIS IS A BAD DATA CARD:'
         MVC   32(80,5),CARD
```

```
         PUT   OUTPT,LOFC
NEWH     BCT   11,START              LOOP BACK TO START IF R11 NE ZERO
         BC    15,NOW                BRANCH TO NOW IF R11 IS ZERO
FINI     MVI   0(5),C'0'             INSERT DOUBLE SAPCE CHARACTER
         MVC   1(79,5),CARD+1        MOVE UPDATE RECORD TO OUTAREA
         PUT   OUTPT,LOFC            PRINT UPDATE RECORD
MYEOF    CLOSE (INPT,,OUTPT)
         L     13,4(13)
         RETURN    (14,12),T
****
*
***LITERAL EXPRESSIONS
*
****
         LTORG
****
*
***PROGRAM STORAGE AREAS AND CONSTANTS
*
****
ERROR    DS    CL1
LOFO     DS    CL133
CARD     DS    CL80
ERRMSG   DC    C'**********CARD FOR ABOVE DWELLING MISPUNCHED IN COLUMN(*
               S)                                                      *
                                        *****'
****
*
***BUILDING TYPE TABLE
*
****
TYPE1    DC    C'DETACHED  '
         DC    C'SEMIDETACH'
         DC    C'DUPLEX    '
         DC    C'ROW HOUSE '
         DC    C'APARTMENT '
         DC    C'TRAILERS  '
****
*
***CONSTRUCTION TYPE TABLE
*
****
TYPE2    DC    C'MASONRY '
         DC    C'FRAME   '
         DC    C'STUCCO  '
         DC    C'OTHER   '
****
*
```

```
***ALTC STCRAGE TABLE
*
****
PARK     DC    C'ATTACHED GARAGE '
         DC    C'CETACHEC GARAGE '
         DC    C'ATTACHEC CARPCRT'
         DC    C'CETACHEC CARPCRT'
         DC    C'G CR C IN CCMP. '
         DC    C'PARKING CNLY    '
****
*
***BASIC EQUIPMENT TABLE
*
****
EQUIP    DC    C'      STOVE      '
         DC    C'      REFRIG     '
         DC    C'GARB DISPCSAL    '
         DC    C'STCVE && REFRIG  '
         DC    C'STCVE && DISPCSAL'
         DC    C'REFRIG && DISP''L '
         DC    C'STCVE, REF, DISP '
         DC    C'      NCNE       '
****
*
***PAGE HEACINGS
*
****
LAMES1   DC    C'1            HOUSE                GROSS                    BAT*
               HS                                                 YR.          *
                        CAT. CCDE    '
LAMES2   DC    C'   STREET   NUMBER  STCRIES  AREA(SF)  BEDROCMS  HALF/*
               FULL   BASIC EQUIP.          TYPE          CONST.   AUTO *
               STCRAGE   /HEW CCDE    '
UNDER1   DC    C'+  ------   ------  -------  --------  --------  -----*
               ----   ----------     '     ----        ------    -----*
INPT     DCB   DDNAME=INPUTAPE,DSORG=PS,MACRF=(GT),LRECL=80,BLKSIZE=960*
               ,RECFM=FB,EODAD=MYEOF
OUTPT    DCB   DDNAME=ARNCLCUT,DSORG=PS,MACRF=(PM),BLKSIZE=133,RECFM=FA
         END

//GO.SYSUDUMP DD SYSOUT=A
//GO.ARNCLCUT DD SYSOUT=A
//GO.INPUTAPE DD DSNAME=ARN.LAME,UNIT=2400,VOLUME=SER=NPS156,DISP=(OLD,
//         KEEP),LABEL=(1,SL)
```

```
//    EXEC ASMALG,REGION.GO=100K,TIME.GO=2
//ASM.SYSIN DD *
*********************************************************************
*********************************************************************
****                                                             ****
**** THIS PROGRAM ACCEPTS INPUT FROM THE MASTER FILE TAPE,       ****
**** PERFORMS ERROR CHECKING, AND OUTPUTS ON THE PRINTER IN EDITED ****
**** FORMAT THE BUILDING AND SPACES PORTION OF THE BUILDING AND  ****
**** SPACES INFORMATION SYSTEM (BASIS)                           ****
****                                                             ****
*********************************************************************
*********************************************************************
          PRINT NOGEN
NAME      CSECT
          USING     *,15
          SAVE      (14,12),T,*
          LR        12,13
          CNOP      0,4
          BAL       13,*+76
          DROP      15
          USING     *,13
          DS        18F
          LA        9,ONE
          USING     ONE,9
          ST        13,8(12)
          ST        12,4(13)
****
*
***INITIALIZE, PRINT HEADING, AND READ CARD
*
****
NAME1     OPEN   (INPT,(INPUT),OUTPT,(OUTPUT))
ORGIN     PUT    OUTPT,BLDG1          PRINT HEADINGS
          PUT    OUTPT,BLDG2
          PUT    OUTPT,UNDER2
          LA     12,8                 R12 IS LOOP COUNT FOR # PRINT LINES
START     LA     3,CARD               R3 CONTAINS INPUT WORK AREA
          LA     4,LOFO2              R4 CONTAINS ADDR OF OUTPUT WORK AREA
          LA     5,LOFO               R5 CONTAINS ADDR OF 2ND OUTPUT AREA
          MVI    ERROR,X'00'          SET ERROR SWITCH
          MVI    SECLINE,X'00'        SET SUPPRESS OUTPUT LINE SWITCH
          MVI    CHECK,X'01'          SET 2ND LINE OF OUTPUT SWITCH
          MVI    SWTCH,X'01'          SET CAPABILITY SWITCH
          MVI    LOFO,C' '            CLEAR OUTPUT WORK AREAS
          MVC    LOFO+1(132),LOFO
          MVC    LOFO+133(133),LOFO
          MVI    0(5),C'0'            INSERT DOUBLE SPACE CHAR.
          GET    INPT,(3)             READ A CARD
```

```
          LP    3,1                     RETURN ADDR OF AREA TO R3
          CLC   10(6,3),=C'UPDATE'      CHECK FOR LAST CARD
          BC    8,FINI                  BRANCH IF LAST CARD FOUND
          CLC   0(3,3),=C'   '          CHECK FOR PRESENCE OF BLDG NUMBER
          BC    8,INVCARD               BRANCH IF NOT PRESENT
****
*
***CHECK COLUMNS 1 THRU 9 FOR LETTERS OR NUMBERS AND EDIT BUILDING
***AND ROOM NUMBERS
*
****
          LR    6,3                     R6 CONTAINS BEGINNING ADDR
          LA    2,3                     R2 IS LOOP COUNTER FOR BCT
CHECK21   CLI   0(6),C'0'               |   CHECK FOR NUMBER
          BC    4,INVBLDG               |
          LA    6,1(6)                  LOAD ADDR OF NEXT COLUMN IN R6
          BCT   2,CHECK21               BRANCH TO CHECK21 IS R2 NE ZERO
RET21     MVC   3(3,5),0(3)             MOVE BLDG # TO OUTPUT AREA
          CLC   3(5,3),=C'     '        CHECK FOR PRESENCE OF ROOM #
          BC    8,*+64                  SKIP AROUND NEXT 16 INST. IF NO #
          CLI   3(3),C' '               |
          BC    8,*+20                  |
          CLI   3(3),C'A'               |
          BC    4,INVROOM               |   CHECK FOR LETTER (VALID)
          CLI   3(3),C'Z'               |   OR BLANK (VALID)
          BC    2,INVROOM               |
          LA    6,4(3)                  LOAD BEGINNING ADDR IN R6
          LA    2,3                     R2 IS LOOP COUNTER FOR BCT
CHECK22   CLI   0(6),C'0'               |   CHECK FOR NUMBER (VALID)
          BC    4,INVROOM               |
          LA    6,1(6)                  LOAD ADDR OF NEXT COLUMN IN R6
          BCT   2,CHECK22               BRANCH TO CHECK22 IF R2 NE ZERO
          CLI   7(3),C' '               |
          BC    8,*+12                  |   CHECK FOR BLANK (VALID) OR
          CLI   7(3),C'A'               |   LETTER (VALID) OR NUMB (VALID)
          BC    4,INVROOM               |
          CLI   8(3),C'*'               |
          BC    8,*+12                  |   CHECK FOR BLANK (VALID) OR
          CLI   8(3),C' '               |   * (VALID)
          BC    7,INVROOM               |
RET22     MVC   11(6,5),3(3)            MOVE ROOM NUMBER TO OUTPUT AREA
****
*
***CHECK COLUMNS 10 THRU 28 FOR NUMBERS AND EDIT ROOM DIMENSIONS
*
****
          LA    6,9(3)                  LOAD BEGINNING ADDR IN R6
          LA    2,18                    R2 IS LOOP COUNTER FOR BCT
```

```
CHECK23  CLI    0(6),C'-'              |
         BC     8,*+16                 |   CHECK FOR - (VALID) OR
         CLI    0(6),C'0'              |   NUMBER (VALID)
         BC     4,INVCARD
         LA     6,1(6)                 LOAD R6 WITH ADDR OF NEXT COLUMN
         BCT    2,CHECK23              BRANCH TO CHECK23 IF R2 NE ZERO
         MVC    19(3,5),9(3)           MOVE 1ST ROOM DIMENSION TO OUTPUT
         MVI    22(5),C'.'
         MVC    23(1,5),12(3)
         MVC    19(3,4),13(3)          MOVE 2ND ROOM DIMENSION TO OUTPUT
         MVI    22(4),C'.'
         MVC    23(1,4),16(3)
****
*
***COMPUTE AND EDIT ROOM SIZE AND EDIT CATEGORY CODE AND NEW CODE
*
****
         PACK   ROOM,9(4,3)            PACK 1ST DIMENSION
         PACK   SIZE,13(4,3)           PACK 2ND DIMENSION
         MP     ROOM,SIZE              MULT TO OBTAIN ROOM SIZE (SQ. FT.)
         AP     ROOM,ROUND             ROUND OFF SIZE
         MVC    ROOM(6),ROOM(5)        GET RID OF UNWANTED DIGIT
         UNPK   RESULT,ROOM+2(4)       UNPACK  ROOM SIZE
         OI     RESULT+6,X'F0'         REMOVE SIGN BIT FROM LAST BYTE
         MVC    27(6,5),RESULT         MOVE INTEGER PART OF SIZE TO OUTPUT
         MVI    33(5),C'.'             INSERT DECIMAL PT
         MVC    34(1,5),RESULT+6       MOVE DECIMAL PART TO OUTPUT AREA
         MVC    38(6,5),17(3)          MOVE CATEGORY CODE TO OUTPUT AREA
         MVI    38(4),C'('             INSERT ( IN 2ND OUTPUT AREA
         MVC    39(4,4),23(3)          MOVE NEW CODE TO 2ND OUTPUT AREA
         MVI    43(4),C')'             INSERT )
****
*
***CHECK COLUMN 28 FOR LETTER CODE, CONVERT TO RMS CLASSIFICATION
***AND EDIT
*
****
         CLI    27(3),C'A'             |
         BC     4,INVCL                |   CHECK FOR LETTERS BETWEEN
         CLI    27(3),C'E'             |   A AND E INCLUSIVE (VALID)
         BC     2,INVCL                |
         SR     10,10                  ZERO R10
         LA     10,CLASS-8             R10 CONTAINS THE ADDR OF CLASS TAB-8
         NI     27(3),X'0F'            STRIP OFF "F"
         SR     6,6                    ZERO R6
         IC     6,27(3)                INSERT STRIPPED CHAR IN R10
         SLL    6,3                    MULT STRIPPED CHAR BY  8 (TAB ENTRY)
         AR     10,6                   R10 CONTAINS ADDR OF DESIRED ENTRY
```

```
         MVC   48(8,5),0(10)       MOVE DESIRED ENTRY TO OUTPUT AREA
****
*
***CHECK COLUMNS 29-31 FOR PROPER CODING AND EDIT NUMBER OF STUDENT
***STATIONS
*
****
PET24    CLC   28(3,3),=C'NA '     CHECK FOR NA
         BC    8,RET25             BRANCH IF EQUAL
         LA    6,28(3)             LOAD R6 WITH BEGINNING ADDR
         LA    2,3                 R2 IS LOOP COUNTER FOR BCT
CHECK24  CLI   0(6),C'0'           |   CHECK FOR NUMBER (VALID)
         BC    4,INVSTA            |
         LA    6,1(6)              LOAD R6 WITH ADDR OF NEXT COLUMN
         BCT   2,CHECK24           BRANCH TO CHECK 24 IF R2 NE ZERO
RET25    MVC   58(3,5),28(3)       MOVE # OF STUDENT STA TO OUTPUT AREA
****
*
***CHECK NPGS CLASSIFICATION IN ORDER TO BRANCH TO PROPER PROCESSING
***ROUTINES
*
****
         CLI   27(3),X'01'         IS THIS ROOM ACADEMIC?
         BC    8,CLASS1            BRANCH IF YES
         CLI   27(3),X'02'         IS THIS RROM SERVICE?
         BC    8,SERVICE           BRANCH IF YES
         CLI   27(3),X'03'         IS THIS ROOM CLASSROOM
         BC    8,CLASS2            BRANCH IF YES
         CLI   27(3),X'04'         IS THIS A TENANT ACTIVITY?
         BC    8,SERVICE           BRANCH IF YES
         CLI   27(3),X'05'         IS THIS A LABORATORY?
         BC    8,CLASS3            BRANCH IF YES
****
*
***CHECK COLUMNS 59 THRU 63 FOR LETTERS AND NUMBERS AND EDIT
***DEPARTMENT AND USE (ACADEMIC ONLY)
*
****
CLASS1   LA    6,58(3)             LOAD R6 WITH BEGINNING ADDR
         LA    2,4                 R2 IS COUNTER FOR
         LA    2,4                 R2 IS LOOP COUNTER FOR BCT
CHECK25  CLI   0(6),C'A'           |
         BC    4,INVDEPT           |   CHECK FOR LETTER (VALID)
         CLI   0(6),C'Z'           |
         BC    2,INVDEPT           |
         LA    6,1(6)              R6 CONTAINS ADDR OF NEXT COLUMN
         BCT   2,CHECK25           BRANCH TO CHECK25 IF R2 NE ZERO
PET27    MVC   103(4,5),58(3)      MOVE DEPARTMENT TO OUTPUT AREA
```

```
         CLI   62(3),C'1'          |
         BC    4,INVUSE            |   CHECK FOR NUMBER BETWEEN
         CLI   62(3),C'8'          |   1 AND 8
         BC    2,INVUSE            |
RET26    SR    10,10               ZERO R10
         LA    10,USE-16           LOAD R10 WITH ADDR USE TABLE-10
         NI    62(3),X'0F'         STRIP OFF "F"
         SR    6,6                 ZERO R6
         IC    6,62(3)             INSERT STRIPPED CHAR IN R6
         SLL   6,4                 MULT CHAR BY 16 (TABLE ENTRY LENGTH)
         AR    10,6                R10 NOW CONTAINS ADDR OF DES. ENTRY
         MVC   112(16,5),0(10)     MOVE USE DESCRIPTION FROM TABLE
         BC    15,NOTA             BRANCH UNCONDITIONALLY TO NOTA
****
*
***BINARY SEARCH ROUTINE FOR NAVY CATEGORY CODE (SERVICE ONLY)
*
****
SERVICE  SR    4,4                 ZERO R4
         LA    8,1                 LOAD R8 WITH BINARY 1
         LA    2,2                 LOAD R2 WITH BINARY 2
         LA    11,32               LOAD R11 WITH LENGTH OF TABLE ENTRY
         LA    10,ONE-32           LOAD R10 WITH 1ST TABLE ADDR
         LA    7,LAST              LOAD R7 LAST TABLE ENTRY ADDR
         SR    7,10                SUB TO GET TABLE SIZE
         SR    6,6                 ZERO R6
         DR    6,11                DIVIDE TO GET NUMBER OF ENTRIES
         SR    6,6                 ZERO R6
         DR    6,2                 DIVIDE BY 2 TO GET MIDDLE OF TABLE
         CR    6,8                 CHECK FOR REMAINDER
         BC    7,NOADD             BRANCH IF NO REMAINDER
         AR    7,8                 ADD 1 TO RESULT OF DIV IF REMAINDER
NOADD    SR    5,5                 ZERO R5
         LR    5,7                 SAVE MIDDLE OF TABLE ENTRY NUMBER
         SR    6,6                 ZERO R6
         MR    6,11                MULT BY ENTRY SIZE
         AR    10,7                ADD TO R7 TO GET ADDR OF MIDDLE
         CLC   17(6,3),0(10)       COMPARE CATEGORY CODES
         BC    4,ALOW              BRANCH IF CODE FROM DATA CARD LOW
         BC    2,AHIGH             BRANCH IF CODE FROM DATA CARD HIGH
         LA    5,LOFO              RELOAD R5 WITH OUTPUT WORK AREA
         MVC   103(26,5),6(10)     MOVE TABLE ENTRY TO OUTPUT AREA
         BC    15,NOTA             BRANCH TO CAPABILITY ROUTINE
ALOW     AR    4,8                 R4 NOW CONTAINS A 1
         C     4,FLWD              CHECKING NUMBER OF COMPARES
         BC    8,ERR1              TOO MANY COMPARES CAUSES BRANCH
         SR    6,6                 ZERO R6
         SR    7,7                 ZERO R7
```

```
                LR      7,5                     RETURN SAVED NUMBER TO R7
                DR      6,2                     HALF TABLE ENTRY NUMBER
                CR      6,8                     CHECK FOR REMAINDER
                BC      7,ODD                   BRANCH IF NO REMAINDER
                AR      7,8                     ADD 1 TO ANSWER IF REMAINDER
ODD             LR      5,7                     SAVE NEW TABLE ENTRY NUMBER
                SR      6,6                     ZERO R6
                MR      6,11                    MULT TO GET SIZE FOR ADD TO LAST ADD
                SR      10,7                    SUB FOR NEW ADDR
                CLC     17(6,3),0(10)           COMPARE CATEGORY CODES
                BC      4,ALOW                  BRANCH IF CODE FROM DATA CARD LOW
                BC      2,AHIGH                 BRANCH IF CODE FROM DATA CARD HIGH
                LA      5,LOFO                  RELOAD R5 WITH ADDR OF OUTPUT AREA
                MVC     103(26,5),6(10)         MOVE DESIRED TABLE ENTRY TO OUTPUT
                BC      15,NOTA                 BRANCH TO CAPABILITY ROUTINE
AHIGH           AR      4,8                     R4 INCREMENTED TO CHECK FOR # OF COM
                C       4,FLWD                  CHECK FOR NUMBER OF COMPARES
                BC      8,ERR1                  BRANCH IF TOO MANY COMPARES
                SR      6,6                     ZERO R6
                SR      7,7                     ZERO R7
                LR      7,5                     RETURN SAVED NUMBER TO R7
                DR      6,2                     DIVIDE BY 2 TO GET NEW TABLE ENTRY #
                CR      6,8                     CHECK FOR REMAINDER
                BC      7,EVEN                  BRANCH IF NO REMAINDER
                AR      7,8                     ADD 1 TO R7 IS REMAINDER
EVEN            LR      5,7                     SAVE TABLE ENTRY NUMBER
                SR      6,6                     ZERO R6
                MR      6,11                    MULT BY TABLE ENTRY SIZE
                AR      10,7                    ADD TO LAST ADDR TO GET NEW ENTRY AD
                CLC     17(6,3),0(10)           COMPARE CATEGORY CODES
                BC      4,ALOW                  BRANCH IF CODE FROM DATA CARD LOW
                BC      2,AHIGH                 BRANCH IF CODE FROM DATA CARD HIGH
                LA      5,LOFO                  RELOAD 5 WITH OUTPUT WORK AREA ADDR
                MVC     103(26,5),6(10)         MOVE DESIRED ENTRY TO OUTPUT AREA
                BC      15,NOTA                 BRANCH TO CAPABILITY ROUTINE
ERR1            LA      5,LOFO                  RELCAD R5 WITH OUTPUT WORK AREA ADDR
                MVC     103(26,5),INVCAT        PRINT BAD CATEGORY CODE
                BC      15,NOTA                 BRANCH TO NOTA
****
*
***CHECK COLUMNS 59-62 FOR LETTER AND EDIT (LABORATORY ONLY)
*
****
CLASS3          LA      6,58(3)                 LOAD BEGINNING ADDR IN R6
                LA      2,4                     R2 IS LOOP COUNTER FOR BCT
CHECK2E         CLI     0(6),C'A'               |
                BC      4,INVDEPT               |   CHECK FOR LETTER (VALID)
                CLI     0(6),C'Z'               |
```

```
         BC    2,INVDEPT          |
         LA    6,1(6)             R6 POINTS TO NEXT COLUMN
         BCT   2,CHECK28          BRANCH IF R2 NE ZERO
RET28    MVC   103(4,5),58(3)     MOVE DEPT NAME TO OUTPUT AREA
         MVC   112(14,5),=C'SEE USAGE DATA'  MOVE TO USE AREA
         BC    15,NOTA            BRANCH TO NOTA
CLASS2   MVC   103(14,5),=C'SEE USAGE DATA'    FOR CLASSROOM ONLY
****
*
***CHECK COLUMNS 32 THRU 58 FOR CODE LETTERS, CONVERT TO CAPABILITIES,
***AND EDIT
*
****
NOTA     CLC   37(3,3),=C'    '   |
         BC    7,INVCAP           |    CHECK FOR PROPER BLANKS IN CAP-
         CLC   56(2,3),=C'   '    |    ABILITY FIELD ON DATA CARD
         BC    7,INVCAP           |
         LA    3,31(3)            LOAD R3 WITH BEGINNING ADDR OF CAP
         LA    4,LOF02            RELOAD R4 WITH 2ND OUTPUT AREA
         LA    8,9                R8 IS LOOP COUNTER FOR CAP COUNTER
HERE     CLI   0(3),C' '          CHECK FOR BLANKS (VALID)
         BC    8,NOW              BRANCH TO CHECK DCPOW IF BLANK
         MVI   SWTCH,X'01'        SET SWITCH IF NOT BLANK
         CLI   0(3),C'A'          |
         BC    4,INVCAP           |    CHECK FOR LETTERS A THRU F
         CLI   0(3),C'F'          |    IN THE ACPOW CAPABILITY FIELD
         BC    2,INVCAP           |
         SR    10,10              ZERO R10
         LA    10,ACPOW-16        LOAD R10 WITH ADDR OF ACPOW TABLE-16
         NI    0(3),X'0F'         STRIP "F" OFF CODE CHAR
         SR    6,6                ZERO R6
         IC    6,0(3)             INSERT STRIPPED CHAR IN R6
         SLL   6,4                MULT STRIPPED CHAR BY 16
         AR    10,6               R10 NOW HOLDS THE ADDR OF ENTRY
         MVC   65(16,5),0(10)     MOVE ACPOW CAP TO OUTPUT AREA
NOW      CLI   9(3),C' '          CHECK FOR BLANK IN OTHER FIELD
         BC    8,THERE            BRANCH IF BLANK FOUND
         MVI   SWTCH,X'01'        SET SWITCH IF NOT BLANK
         CLI   9(3),C'J'          |
         BC    4,INVCAP           |    CHECK FOR LETTERS FROM
         CLI   9(3),C'R'          |    J THRU R (VALID)
         BC    2,INVCAP           |
         SR    10,10              ZERO R10
         LA    10,OTHER-8         LOAD R10 WITH ADDR OF OTHER TABLE-8
         NI    9(3),X'0F'         STRIP "F" OFF CODE CHAR
         SR    6,6                ZERO R6
         IC    6,9(3)             INSERT STRIPPED CHAR IN R6
         SLL   6,3                MULT CHAR BY 8
```

```
                AR      10,6                    R10 NOW HOLDS ADDR OF DES. TAB ENRRY
                MVC     92(8,5),0(10)           MOVE ENTRY FROM OTHER TAB TO OUTPUT
THERE           CLI     18(3),C' '              CHECK FOR BLANK
                BC      8,LATER                 BRANCH IF BLANK FOUND
                MVI     SWTCH,X'01'             SET SWITCH IF BLANK NOT FOUND
                CLI     18(3),C'S'              |
                BC      4,INVCAP                |   CHECK FOR LETTERS
                CLI     18(3),C'Y'              |   S THRU Y (VALID)
                BC      2,INVCAP                |
                SR      10,10                   ZERO R10
                LA      10,DCPOW-16             LOAD R10 ADDR OF DCPOW TABLE-16
                NI      18(3),X'0F'             STRIP OF "F" FROM CHAR
                SR      6,6                     ZERO R6
                IC      6,18(3)                 INSERT STRIPPED CHAR IN R6
                SLL     6,3                     MULT CHAR BY 8
                AR      10,6                    R10 NOW HOLDS THE ADDR OF ENRRY
                MVC     81(8,5),0(10)           MOVE ENTRY FROM DCPOW TAB TO OUTPUT
****
*
***PRINT AND RETURN ROUTINES
*
****
LATER           CLI     SWTCH,X'01'             IS SWITCH SET?
                BC      7,ENUF                  IF NO THEN BRANCH AND DON'T PRINT
                CLI     SECLINE,X'01'           IS 2ND LINE OF OUTPUT SWITCH SET?
                BC      7,*+12                  BRANCH AROUND NEXT TWO INSTRUCTION
                MVI     LOF0,C'+'               INSERT SUPPRESS CHAR
                MVI     SECLINE,X'00'           RESET SECLINE SWITCH
                PUT     OUTPT,LOF0              PRINT FROM 1ST OUTPUT AREA
                MVI     LOF0,C' '               CLEAR 1ST OUTPUT AREA
                MVC     LOF0+1(132),LOF0
                MVI     SWTCH,X'00'             RESET SWITCH
                CLI     CHECK,X'01'             IS CHECK SWITCH SET?
                BC      7,ENUF                  IF NOT DON'T PRINT LOF02
                PUT     OUTPT,LOF02             PRINT 2ND LINE OF OUTPUT
                OI      SECLINE,X'01'           SET SECLINE SWITCH
                MVI     CHECK,X'00'             RESET CHECK SWITCH
ENUF            LA      3,1(3)                  LOAD R3 WITH ADDR OF NEXT CAP COL
                BCT     8,HERE                  BRANCH TO HERE IF R8 NE ZERO
                CLI     ERROR,X'01'             IS ERROR SWITCH SET?
                BC      7,NEWRM                 IF NOT BRANCH AROUND ERROR ROUTINES
OUTERR          PUT     OUTPT,ERRMSG            PRINT ERROR MESSAGE
                MVI     ERRMSG+55,C' '          CLEAR ERROR MESSAGE AS NECESSARY
                MVC     ERRMSG+56(70),ERRMSG+55
NEWRM           BCT     12,START                BRANCH TO START IF R12 NE ZERO
                BC      15,ORGIN                BRANCH TO ORIGIN
```

```
****
*
***ERROR ROUTINES
*
****
INVCARD  MVC   1(30,5),=C'******THIS IS A BAD DATA CARD:'
         MVC   32(80,5),CARD
         PUT   OUTPT,LOFD
         BC    15,NEWRM
INVRLDG  MVC   ERRMSG+55(8),=C'1 THRU 3'
         MVI   ERROR,X'01'
         BC    15,RET21
INVROOM  MVC   ERRMSG+64(8),=C'4 THRU 9'
         MVI   ERROR,X'01'
         BC    15,RET22
INVCL    MVC   ERRMSG+84(2),=C'28'
         MVI   ERROR,X'01'
         BC    15,RET24
INVSTA   MVC   ERRMSG+87(10),=C'29 THRU 31'
         MVI   ERROR,X'01'
         BC    15,RET25
INVDEPT  MVC   ERRMSG+109(10),=C'59 THRU 62'
         MVI   ERROR,X'01'
         BC    15,RET27
INVUSE   MVC   ERRMSG+120(2),=C'63'
         MVI   ERROR,X'01'
         BC    15,RET26
INVCAP   MVC   ERRMSG+98(10),=C'32 THRU 58'
         BC    15,OUTERR
FINI     MVI   0(5),C'0'              DOUBLE SPACE CHARACTER
         MVC   1(79,5),CARD+1         MOVE UPDATE RECORD TO OUTPUT AREA
         PUT   OUTPT,LOFC             PRINT UPDATE RECORD
MYEOF    CLOSE (INPT,,OUTPT)
         L     13,4(13)
         RETURN    (14,12),T
****
*
***LITERAL EXPRESSIONS
*
****
         LTORG
****
*
***STORAGES AND CONSTANTS
*
****
RESULT   DS    CL7
SECLINE  DS    CL1
```

```
CHECK    DS    CL1
SWTCH    DS    CL1
ROOM     DC    PL6'0'
SIZE     DC    PL3'0'
ROUND    DC    PL1'5'
LOFO     DS    CL133
LOFO2    DS    CL133
FLWD     DC    F'8'
ERROR    DS    CL1
CARD     DS    CL80
ERRMSG   DC    C'@@@@@@@@CARD FOR ABOVE SPACE MISPUNCHED IN COLUMN(S)  *
                                                                      *
                                    @@@@@@@'
INVCAT   DC    C'INVALID CATEGORY CODE     '
****
*
***RMS CLASSIFICATION TABLE
*
****
CLASS    DC    C'ACADEMIC'
         DC    C'SERVICE '
         DC    C'CLASSRM '
         DC    C'TENANT  '
         DC    C'LAB''TORY'
****
*
***AC POWER CAPABILITIES TABLE
*
****
ACPOW    DC    C'120V 60C 1PH    '
         DC    C'120V 60C 3PH    '
         DC    C'220V 60C 3PH    '
         DC    C'440V 60C 3PH    '
         DC    C'120V 400C 2PH   '
         DC    C'120V 400C 3PH   '
****
*
***DC POWER CAPABILITIES TABLE
*
****
DCPOW    DC    C'28V     '
         DC    C'120V    '
         DC    C'250V    '
         DC    C'400V    '
         DC    C'500V    '
         DC    C'2000V   '
         DC    C'BAT.125V'
```

```
****
*
***"OTHER" CAPABILITIES TABLE
*
****
OTHER    DC    C'GAS      '
         DC    C'COMP AIR '
         DC    C'VACUUM   '
         DC    C'H. WATER '
         DC    C'C. WATER '
         DC    C'SEAWATER '
         DC    C'CC TV    '
         DC    C'SOUND    '
         DC    C'SCREEN   '
****
*
***ACADEMIC USE CATEGORIES TABLE
*
****
USE      DC    C'OFFICE           '
         DC    C'SPEC CLRM && LAB '
         DC    C'STORAGE          '
         DC    C'DEPT CONF && REF '
         DC    C'STU-FAC RSCH LAB '
         DC    C'STUDENT STUDY    '
         DC    C'DEPT SUPPORT ACT '
         DC    C'ACCESSORY        '
****
*
***NAVY CATEGORY CODE TABLE
*
****
ONE      DC    C'000-00                                '
         DC    C'122-10MARINE REFUELING                '
         DC    C'123-10FILLING STATION (EXCH)          '
         DC    C'124-50VEH. READY FUEL STOR. TK.       '
         DC    C'131-15COMMUNICATIONS CENTER           '
         DC    C'133-10METERLOGICAL BLDG.              '
         DC    C'141-60PHOTO-LAB                       '
         DC    C'141-830PCON CENTER                    '
         DC    C'151-20BERTHING PIER                   '
         DC    C'152-20BERTHING WHARF                  '
         DC    C'159-62SMALL CRAFT BOATHOUSE           '
         DC    C'171-10ACAD. && GEN. INSTRUCTION       '
         DC    C'171-20APPLIED INSTRUCTION             '
         DC    C'171-25AUDITORIUM (KING HALL)          '
         DC    C'211-50ENGINE TEST CELL                '
         DC    C'213-41CENTRAL TOOL SHOP               '
```

```
DC     C'213-54ELECTRIC SHOP                '
DC     C'214-20AUTO VEH. MAINT. FAC.        '
DC     C'214-40VEH. MAINTENANCE SHED        '
DC     C'219-10PUBLIC WORKS MAINT. FAC.     '
DC     C'229-50PRINTING PLANT               '
DC     C'310-20CHEMICAL LABRATORY           '
DC     C'310-48METALLURGY LABRATORY         '
DC     C'310-54NUC. PHYSICS && CHEM. LAB    '
DC     C'310-58PHYSICS LABRATORY            '
DC     C'310-75MATHEMATICS BLDG             '
DC     C'310-86GENERAL PURPOSE LAB.         '
DC     C'310-87APPLIED RESEARCH LAB.        '
DC     C'310-88ENVIRONMENTAL LABRATORY      '
DC     C'442-10GENERAL WAREHOUSE-R/I        '
DC     C'442-65CLOTHING && SMALL STORES     '
DC     C'442-90PUBLIC WORKS STORAGE         '
DC     C'540-10DENTAL CLINIC                '
DC     C'550-10DISPENSARY WITH BEDS         '
DC     C'550-20DISPENSARY WITHOUT BEDS      '
DC     C'610-10ADMIN. OFFICE                '
DC     C'690-10FLAGPOLE                     '
DC     C'721-20EW BARRACKS WITHOUT MESS     '
DC     C'722-10EM BARRACKS WITHOUT MESS     '
DC     C'723-10MESS HALL                    '
DC     C'724-10BOQ WITH MESS                '
DC     C'724-30OFFICERS MESS (CLOSED)       '
DC     C'730-10FIRE STATION                 '
DC     C'730-20POLICE STATION               '
DC     C'730-25GATE/SENTRY HOUSE            '
DC     C'730-65AIR RAID/STORM SHELTER       '
DC     C'740-10CHAPEL                       '
DC     C'740-14EXCHANGE                     '
DC     C'740-18BANK                         '
DC     C'740-19CREDIT UNION                 '
DC     C'740-20GUEST HOUSE                  '
DC     C'740-26CIV. CAFE/REST./SNACK BAR    '
DC     C'740-33POST OFFICE                  '
DC     C'740-36HOBBY SHOP                   '
DC     C'740-40BOWLING ALLEY                '
DC     C'740-43GYMNASIUM                    '
DC     C'740-60OFFICERS CLUB (OPEN)         '
DC     C'740-63EM SERVICE CLUB              '
DC     C'740-70CPO CLUB                     '
DC     C'740-74CHILD CARE CENTER            '
DC     C'740-76LIBRARY                      '
DC     C'740-80GOLF CLUB HOUSE              '
DC     C'750-10PLAYING COURT                '
DC     C'750-20PLAYING FIELD && FAC.        '
```

```
          DC     C'750-30OUTDOOR SWIMMING POOL      '
          DC     C'750-40GOLF COURSE                '
          DC     C'821-20HEATING PLANT,OIL          '
          DC     C'821-50STEAM PLANT                '
          DC     C'823-20GAS STORAGE TANKS          '
          DC     C'852-10PARKING AREA               '
          DC     C'852-20SIDEWALK                   '
          DC     C'872-10SECURITY FENCING && WALLS  '
          DC     C'880-10FIRE ALARM SYSTEM          '
          DC     C'880-30AIR RAID ALARM SYSTEM      '
          DC     C'890-20COMPRESSED AIR PLANT       '
          DC     C'890-40AIR CONDITIONING PLANT     '
          DC     C'939-10HEAD                       '
          DC     C'939-11HALLWAY                    '
          DC     C'939-12STAIRWAY                   '
          DC     C'939-20FLEET NUM. WEATHER CENTER  '
          DC     C'939-21NAVY SYSTEM MGT. CENTER    '
LAST      DC     C'999-99                           '
****
*
***PAGE HEADINGS
*
****
BLDG1     DC     C'1BUILDING  SPACE   SIZE      AREA      CAT. CODE     RMS *
                    STA-              C-A-P-A-B-I-L-I-T-I-E-S                *
                                      '
BLDG2     DC     C'  NUMBER   NUMBER  (FT.)  (SQ. FT.)  (HEW CODE)  CLASS*
                  .   IONS     DC POWER      AC POWER    OTHER      DEPT.  *
                    CEPT. USE             '
UNDER2    DC     C'+--------  ------  -----  ---------  ---------   -----*
                  -   -----    ----------'-------------------      -----  *
                  ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
OUTPT     DCB    DDNAME=ARNCLOUT,DSORG=PS,MACRF=(PM),BLKSIZE=133,RECFM=FA
INPT      DCB    DDNAME=ARNOLDIN,DSORG=PS,MACRF=(GT),LRECL=80,BLKSIZE=960*
                 ,RECFM=FB,EODAD=MYEOF
          END

//GO.SYSUDUMP DD SYSOUT=A
//GO.ARNCLOUT DD SYSOUT=A
//GO.ARNOLDIN DD DSNAME=ARN.BLDH,UNIT=2400,VOLUME=SER=NPS156,DISP=(OLD,
//         KEEP),LABEL=(1,SL)
```

```
//    EXEC ASMALG,REGION.GO=100K,TIME.GC=2
//ASM.SYSIN DD *
*********************************************************************
*********************************************************************
****                                                             ****
**** THIS PROGRAM ACCEPTS INPUT FROM THE MASTER FILE TAPE OF THE ****
**** CLASSROOM AND LABORATORY USAGE PORTION OF THE BUILDING AND  ****
**** SPACES INFORMATION SYSTEM (BASIS), PERFORMS ERROR CHECKING AND****
**** PRINTS EACH RECORD IN EDITED FORMAT.  IT ALSO WRITES ON     ****
**** SEPERATE TAPES THE EMPTY ROOM DATA AND HISTORICAL LOAD FACTOR ****
**** DATA FROM EACH RECORD                                       ****
****                                                             ****
*********************************************************************
*********************************************************************
          PRINT NOGEN
NAME      CSECT
          USING     *,15
          SAVE      (14,12),T,*
          LR        12,13
          CNOP      0,4
          BAL       13,*+76
          DROP      15
          USING     *,13
          DS        18F
          LA    8,ERROR
          USING ERROR,8
          ST        13,8(12)
          ST        12,4(13)
*****
*
***PRINT HEADINGS AND INITIALIZE PROGRAM
*
*****
NAME1     OPEN  (INPT,,OUTPT,(OUTPUT))
BEGIN     LA    11,CARD             R11 HOLDS THE ADDR OF THE INAREA
          LA    5,LOFO              R5 HOLDS THE ADDR OF ONE OF OUTAREA
          MVI   LOFC,C' '           CLEAR BOTH OUTAREAS
          MVC   LOFO+1(132),LOFO
          MVC   LOFC+133(133),LOFO
          MVI   0(5),C'1'           INSERT PAGE EJECT CHAR IN OUTAREA
          MVC   62(7,5),=C'EXAMPLE'
          PUT   OUTPT,LOFO
          MVI   LOFO,C' '
          MVC   LOFO+1(132),LOFC
          MVI   0(5),C'0'
          MVC   64(4,5),=C'0800'
          PUT   OUTPT,LOFO
          MVI   LOFC,C' '
```

```
                MVC   LOFC+1(132),LOFC
                MVI   LOFC,C'+'
                MVC   60(12,5),=C'------------'
                PUT   OUTPT,LOFO
                MVI   LOFC,C' '
                MVC   LOFC+1(132),LOFC
                MVI   59(5),C'|'
                MVI   71(5),C'|'
                PUT   OUTPT,LOFO
                PUT   OUTPT,EX3
                PUT   OUTPT,LOFO
                PUT   OUTPT,EX4
                MVI   LOFC,C' '
                MVC   LOFO+1(132),LOFC
                MVI   LOFC,C'+'
                MVC   60(12,5),=C'------------'
                PUT   OUTPT,LOFO
                MVI   ERRCR,X'00'          RESET ERROR MESSAGE SWITCH
                LA    12,3                 P12 IS PRINT CTR (3 ROCMS/PAGE)
START           LA    3,WEEK               R3 HOLDS ADDR OF WEEK SIZE STORE ARA
                LA    5,LOFO               R5 HOLDS ADDR OF ONE OF THE OUTAREAS
                LA    4,LOFO2              R4 HOLDS ADDR OF OTHER OUTAREA
                MVI   0(3),C' '            CLEAR WEEK SIZE STORAGE AREA
                MVC   1(255,3),0(3)
                MVC   256(144,3),0(3)
*****
*
***READ RECORDS FOR ONE WEEK (5 RECORDS)
*
*****
                LA    2,5                  R2 IS DAY CTR (5 DAYS/WEEK)
GETSOME         GET   INPT,(11)            READ A RECORD
                LR    11,1                 PASS ADDR OF RECORD TO R11 IN R1
                MVC   0(80,3),0(11)        MOVE INPUT DATA TO WORK AREA
                CLI   0(3),C'$'            LOOKING FOR ROOM DELIMITER
                BC    8,WARN1              BRANCH IF FOUND PRIOR TO 5 RECORDS
                LA    3,80(3)              INCREMENT R3 BY 80 (PT TO NEXT REC)
                BCT   2,GETSOME            BRANCH AND GET ANOTHER REC IF < 5
*****
*
***LOAD DATA INTO STORAGE AREA FOR LATER WRITING ON HISTORICAL
***LOAD FACTOR TAPE
*
*****
                LA    3,WEEK               RESET R3 TO START OF WEEK SIZE AREA
START1          MVI   LOFC,C' '            CLEAR ONE OF THE OUTAREAS
                MVC   LOFC+1(132),LOFC
                MVI   0(5),C'0'            INSERT DOUBLE SPACE CHARACTER
```

THESE 25 INSTRUCTIONS PRINT THE "EXAMPLE" FOUND AT THE TOP OF EACH PAGE OF PROGRAM OUTPUT.

```
          PUT   OUTPT,LOF0          PRINT DOUBLE SPACE
          MVI   ACCUM,C' '          CLEAR ACCUM STORAGE AREA
          MVC   ACCUM+1(14),ACCUM
          MVC   ACCUM(6),0(3)       MOVE ROOM # AND USE CODE TO ACCUM
          MVC   ACCUM+10(1),73(3)   MOVE QUARTER NUMBER TO ACCUM
          MVC   ACCUM+11(2),74(3)   MOVE ACADEMIC YEAR TO ACCUM
*****
*
***CHECK FOR PROPER USE (CLASSROOM OR LABORATORY) CODE AND
***FOR DIGITS IN THE STUDENT STATION FIELD AND PRINT ROOM HEADING
*
*****
          MVC   10(5,5),AST         MOVE AST CONSTANT TO OUTAREA
          MVC   15(5,5),0(3)        MOVE ROOM NUMBER TO OUTAREA
          CLI   5(3),X'C3'          CHECK FOR CLASSROOM CODE
          BC    7,*+14              BRANCH AROUND NEXT 2 INST IF NOT C3
          MVC   21(9,5),=C'CLASSROOM'   MOVE LITERAL TO OUTAREA
          BC    15,*+26             BRANCH AROUND NEXT 5 INSTRUCTIONS
          CLI   5(3),X'D3'          CHECK FOR LABRATORY CODE
          BC    8,*+12              BRANCH AROUND NEXT 2 INSTRUCTIONS
          MVI   ERROR,X'01'         SET ERROR MSG SW IF C3 OR D3 NOT FND
          BC    8,*+10              BRANCH AROUND NEXT INSTURCTION
          MVC   21(9,5),=C'LABORATORY'  MOVE LITERAL TO OUTAREA
          LA    6,3                 R6 IS LOOP COUNTER FOR BCT
          LA    7,6(3)              R7 POINTS TO STUDENT STA FIELD
CHECK9    CLI   0(7),C'0'           |   CHECK FOR NUMBERS (VAIID)
          BC    4,BADNUM            |
          LA    7,1(7)              INCREMENT R7 BY ONE
          BCT   6,CHECK9            BRANCH IF ENTIRE FIELD NOT CHECKED
          MVC   32(3,5),6(3)        MOVE STUDENT STATION NO. TO OUTAREA
          MVC   36(16,5),=C'STUDENT STATIONS'   MOVE LITERAL TO OUTAREA
          MVC   52(5,5),AST         MOVE AST CONSTANT TO OUTAREA
          PUT   OUTPT,LOF0          PRINT ROOM HEADING
          MVI   LOFC,C' '           CLEAR BOTH OUTAREAS
          MVC   LOF0+1(132),LOFC
          MVC   LOF0+133(133),LOF0
*****
*
***CHECK THE 5 WEEKLY CARDS FOR CORRECT ROOM NUMBER AND DAY CODE
***FROM 1 TO 5 IN THAT ORDER
*
*****
          LA    10,1                R10=1
          LA    6,1                 R6=1
          LA    2,4                 R2 IS LOOP COUNTER
COMPARE   CLC   0(5,3),80(3)        COMPARE ROOM NOS. ON 1ST TWO RECORD
          BC    7,WARN              BRANCH IF ROOM NOS. NOT =
          SR    7,7                 ZERO R7
```

```
         NI    9(3),X'0F'          STRIP ZONE HALF OFF DAY CODE NO.
         IC    7,9(3)              INSERT RESULTING BINARY NO. IN R7
         CR    6,7                 CHECKING FOR CARDS IN DAILY ORDER
         BC    7,WARN              BRANCH IF CARDS NOT IN ORDER FOR WK
         LA    3,80(3)             INCREMENT R3 BY 80
         AR    6,10                ADD ONE TO CONTENTS OF R6
         BCT   2,COMPARE           BRANCH IF R2 NE TO ZERO
         SR    7,7                 ZERO R7
         NI    9(3),X'0F'          STRIP OF ZONE HALF OF DAY CODE
         IC    7,9(3)              INSERT RESUTLING BINARY NO. IN R7
         CR    6,7                 CHECKING FOR CARDS IN DAILY ORDER
*****
*
***HOUSE KEEPING AND PARTIAL PRINTING OF SCHEDULE BLOCK
*
*****
         BC    7,WARN              BRANCH IF CARDS NOT IN ORDER FOR WK
         LA    3,WEEK              RESET R3 TO ADDR OF WEEK SIZE AREA
         LA    2,5                 RELOAD R2 WITH 5 FOR LOOP COUNT
         ZAP   SAVLE,MORZES        ZERO SAVLE
         PUT   OUTPT,HOUR          PRINT "HOUR" CONSTANT
         PACK  STUSTA,6(3,3)       PACK STUDENT STATION NO. IN TORE ARE
BEGIN3   LA    5,LOFO              RESET R5 WITH ADDR OF LOFO
         LA    4,LOFO2             RESET R4 WITH ADDR OF LOFO2
LOOP1    PUT   OUTPT,LINE          PRINT "LINE" CONSTANT
*****
*
***COLLECT ROOM NUMBER, DAY CODE, AND NUMBER OF STUDENT STATIONS
***FOR EMPTY ROOM RECORD
*
*****
         MVI   SPEC,C' '           CLEAR TAPE OUTPUT AREA
         MVC   SPEC+1(17),SPEC
         MVC   SPEC(1),9(3)        MOVE DAY CODE TO TAPE OUTAREA
         MVC   SPEC+5(6),0(3)      MOVE ROOM NO. TO TAPE OUTAREA
         MVC   SPEC+11(3),6(3)     MOVE NO. OF STUDENT STATIONS TO OUT
*****
*
***CONVERT DAY CODE AND PRINT PART OF SCHEDULE BOX FOR THAT DAY
*
*****
         LA    10,MON-133          R10 HOLDS ADDR OF MON TABLE LESS 133
         SR    6,6                 ZERO R6
         SR    9,9                 ZERO R9
         LA    7,133               R7=133 (FIXED TABLE ENTRY LENGTH)
         NI    9(3),X'0F'          STRIP ZONE HALF OFF DAY CODE
         IC    9,9(3)              INSERT RESULTING BINARY NO. IN R9
         MR    6,9                 MULT 133 BY THE BINARY NUMBER
```

```
         AR    7,10                    ADD RESULTING NO. TO TABLE ADDR
         MVC   0(133,5),0(7)           MOVE ENTRY TO OUTAREA
         PUT   OUTPT,LOFD              PRINT TABLE ENTRY
         MVI   0(5),C'+'               INSERT SPACING SUPPRESSION CHAR
         MVI   0(4),C'+'               INSERT SPACING SUPPRESSION CHAR
*****
*
***LOAD REGISTERS WITH ADDRESSES FOR PROCESSING OF HOURLY DATA
***AND CHECK FOR EMPTY ROOM
*
*****
         LA    3,10(3)                 R3 POINTS TO FIRST HOURLY FIELD
         LA    5,9(5)                  R5 POINTS TO FIRST OUTAREA FIELD
         LA    4,9(4)                  R4 PTS TO 2ND LINE OF 1ST OUTAREA FD
         LA    9,9                     ZERO R9
         ZAP   SAVADD,MORZES           ZERO SAVADD
LOOP2    CLC   0(3,3),=C'000'          CHECK FOR UNOCCUPIED ROOM
         BC    8,EMPTY                 BRANCH IF ROOM EMPTY
*****
*
***CHECK TO INSURE A NUMBER IS PUNCHED IN NUMBER OF STUDENTS FIELD
***COMPUTE HOURLY LOAD FACTOR, AND SAVE IT FOR USE IN DAILY LOAD
***FACTOR COMPUTATION
*
*****
         LA    6,3                     R6 IS LOOP COUNTER FOR BCT
         LA    7,0(3)                  R7 HOLDS ADDR OF NO. OF STUDENT FLD
CHECK11  CLI   0(7),C'0'               |   CHECK FOR NUMBERS (VALID)
         BC    4,BADNUM                |
         LA    7,1(7)                  INCREMENT R7 BY ONE
         BCT   6,CHECK11               BRANCH IF FIELD NOT CHECKED
         MVC   0(3,5),0(3)             MOVE NO. OF STUDENTS TO OUTAREA
         ZAP   LOADF,MORZES            ZERO LOADF
         PACK  LOADF(4),0(3,3)         PACK NO. OF STUDENTS INTO LOADF
         MVN   LOADF+4(1),LOADF+3
         MVN   LOADF+3(1),ZEROS
         DP    LOADF,STUSTA            DIVIDE NO. OF STU BY NO. OF STATIONS
         AP    SAVADD,LOADF(3)         ADD RESULT TO DAILY TOTAL
         UNPK  RESULT,LOADF(3)         UNPACK RESULT INTO AREA "RESULT"
         OI    RESULT+4,X'F0'          ZONE HALF OF LAST DIGIT NOW RIGHT
         MVC   5(1,5),RESULT+2         MOVE WHOLE NUMBER TO OUTAREA
         MVI   6(5),C'.'               INSERT DECIMAL POINT
         MVC   7(2,5),RESULT+3         MOVE FRACTIONAL PART TO OUTAREA
*****
*
***CHECK FOR LETTERS IN CURRICULUM AND DEPARTMENT FIELDS
*
*****
```

```
*
***COMPUTE, PRINT, AND STORE ON TAPE QUARTERLY LOAD FACTOR
*
*****
          LA     5,LOFC                  RELOAD ADDR OF LOFC IN R5
          PUT    OUTPT,LINE              PRINT "LINE" CONSTANT
          MVC    0(133,5),QTR            MOVE "QTR" CONSTANT TO OUTAREA
          DP     SAVLF,NUMDAY            DIVIDE TOTAL WEEKLY LF BY 5
          UNPK   RESULT,SAVLF(2)         UNPACK RESULT INTO RESULT
          OI     RESULT+4,X'F0'          MAKE LAST DIGIT RIGHT FOR PRINTING
          MVC    20(2,5),RESULT+1        MOVE WHOLE NUM. TO OUTAREA
          MVI    22(5),C'.'              INSERT DECIMAL POINT
          MVC    23(2,5),RESULT+3        MOVE FRACTIONAL PART TO OUTAREA
          MVC    ACCUM+6(4),21(5)        MOVE COMPUTED QTRLY LOAD FACTOR
          PUT    WTPE1,ACCUM             WRITE ACCUM RECORD ON HIST LF TAPE
          PUT    OUTPT,LOFC              PRINT QUARTERLY LOAD FACTOR
          BC     15,GETMORE              BRANCH TO CHECK FOR DELIMITER
*****
*
***DETERMINE HOUR THAT ROOM IS EMPTY AND WRITE RECORD ON TAPE
*
*****
EMPTY     LA     6,TIME-4                LOAD R6 WITH ADDR TIME TABLE-4
          SR     7,7                     ZERO R7
          LR     7,9                     LOAD R9 INTO R7
          SLL    7,2                     MULT CONTENTS R7 BY 2(TAB ENTRY LEN)
          AR     6,7                     ADD RESULT TO 1ST ENTRY ADDRESS
          MVC    SPEC+1(4),0(6)          MOVE HOUR FROM TABLE TO TAPE OUTAREA
          PUT    WTPE2,SPEC              WRITE EMPTY ROOM DATA ON TAPE
          MVC    SPEC+1(4),=C'    '      CLEAR HOUR FIELD OF EMPTY ROOM REC
          BC     15,NOUSE                RETURN TO MAIN PROGRAM
*****
*
***PRINT ERROR MESSAGES FOR LESS THAN 5 CARDS AND INVALID NUMERIC
***FIELD IF REQUIRED
*
*****
WARN1     LA     3,WEEK                  RELOAD ADDR OF WEEK SIZE AREA IN R3
          MVC    0(10,5),=C'0@@@@@@@@@'  |
          MVC    10(5,5),0(3)            |   PRINT ERROR MESSAGE FOR
          MVC    17(36,5),TOOFEW         |   LESS THAN 5 RECORDS
          MVC    53(10,5),=C'@@@@@@@@@@' |   PER WEEK
          PUT    OUTPT,LOFC              |
          BC     15,CNTR                 BRANCH TO CNTR
BADNUM    PUT    OUTPT,LOFC              PRINT BAD RECORD
          MVI    LOFC,C' '               CLEAR OUTAREA
          MVC    LOFC+1(132),LOFC
```

```
         LA    6,4                  R6 IS LOOP COUNTER FOR BCT
         LA    7,3(3)               R7 POINTS TO CURR AND DEPT FIELDS
CHECK10  CLI   0(7),C'A'            |
         BC    4,INVCIR             |   CHECK FOR LETTER
         CLI   0(7),C'Z'            |   (VALID)
         BC    13,*+8               |
INVCIR   MVI   ERROR,X'01'          SET ERROR MSG SW IF ERROR FOUND
         LA    7,1(7)               INCREMENT R7 BY ONE
         BCT   6,CHECK10            BRANCH IF ENTIRE FIELD IS CHECKED
RET11    MVC   0(2,4),3(3)          MOVE CURR ABBREV. TO 2ND LINE OUTARA
         MVC   5(2,4),5(3)          MOVE DEPT ABBREV. TO 2ND LINE OUTARA
NOUSE    LA    3,7(3)               R3 POINTS TO NEXT HOUR FIELD
         LA    5,12(5)              R5 POINTS TO NEXT 1ST LINE OUT FIELD
         LA    4,12(4)              R4 POINTS TO NEXT 2ND LINE OUT FIELD
         BCT   9,LOOP2              BRANCH IF ENTIRE DAY NOT PROCESSED
*****
*
***COMPUTE DAILY LOAD FACTOR AND PRINT A COMPLETE DAY'S OUTPUT
*
*****
         DP    SAVADD,NUMHRS        DIVIDE TOTAL LF FOR DAY BY 9
         AP    SAVLF,SAVADD(2)      ADD TO TOTAL WEEKLY (QRTRLY LF)LF
         UNPK  RESULT,SAVADD(2)     UNPACK RESULT INTO RESULT
         OI    RESULT+4,X'F0'       MAKE ZONE HALF RIGHT FOR PRINTING
         MVC   0(1,5),RESULT+2      MOVE WHOLE NO. TO OUTAREA
         MVI   2(5),C'.'            INSERT DECIMAL POINT
         MVC   3(2,5),RESULT+3      MOVE FRACTIONAL PART TO OUTAREA
         PUT   OUTPT,LOF0           PRINT 1ST DAILY LINE
         PUT   OUTPT,MARK           PRINT "LINE" CONSTANT
         PUT   OUTPT,LOF02          PRINT 2ND DAILY LINE
         MVI   LOFC,C' '            CLEAR BOTH OUTAREAS
         MVC   LOFC+1(132),LOFC
         MVC   LOFC+133(133),LOF0
         LA    3,7(3)               R3 NOW PTS TO NEXT DAILY RECORD
*****
*
***PRINT INVALID CHARACTER FIELD ERROR MESSAGE IF ONE IS FOUND
*
*****
         CLI   ERROR,X'01'          HAS ERROR SWITCH BEEN SET?
         BC    7,*+38               IF NOT BRANCH AROUND NEXT 5 INST.
         MVI   LOF0,C' '            CLEAR AN OUTAREA
         MVC   LOF0+1(132),LOF0
         MVC   LOFC(53),INVCHAR     MOVE ERROR MSG TO OUTAREA
         PUT   OUTPT,LOF0           PRINT ERROR MSG
         MVI   ERROR,X'00'          RESET ERROR MSG SWITCH
         BCT   2,BEGIN3             BRANCH IF ENTIRE WEEK IS NOT FINISH
*****
```

```
          MVC   LOFC(50),BADNUMB     MOVE BAD NUMBER ERROR MSG TO OUTAREA
          PUT   OUTPT,LOFO           PRINT ERROR MSG
          BC    15,GETMORE           BRANCH TO CHECK FOR ROOM DELIMITER
WARN      PUT   OUTPT,WARNING        PRINT WARNING MESSAGE
*****
*
***CHECK FOR DELIMITER BETWEEN DECKS FOR EACH ROOM
*
*****
GETMORE   GET   INPT,(11)            READ NEXT RECORD
          LR    11,1                 PASS ADDR OF RECORD TO R11 IN R1
          CLC   10(6,11),=C'UPDATE'  CHECK FOR LAST CARD
          BC    8,FINI               BRANCH IF LAST CARD FOUND
          CLI   0(11),C'$'           CHECKING FOR ROOM DELIMITER
          BC    7,GETMORE            BRANCH AND READ ANOTHER REC IF NOT =
CNTR      BCT   12,START             BRANCH TO START IF 3 ROOMS NOT PRINT
          BC    15,BEGIN             BRANCH TO BEGIN IF 3 ROOMS PRINTED
FINI      MVI   0(5),C'0'            INSERT DOUBLE SPACE CHARACTER
          MVC   1(79,5),CARD+1       MOVE UPDATE RECORD TO OUTAREA
          PUT   OUTPT,LOFO           PRINT UPDATE RECORD
MYEOF     CLOSE (INPT,,OUTPT)
          L     13,4(13)
          RETURN    (14,12),T
*****
*
***LITERAL EXPRESSIONS
*
*****
          LTORG
*****
*
***PROGRAM STORAGE AREAS AND GENERAL CONSTANTS
*
*****
ERROF     DS    CL1
LOFO      DS    CL133
LOFO2     DS    CL133
WEEK      DS    5CL80
CARD      DS    CL80
AST       DC    C'*****'
MORZES    DC    PL1'0'
LOADF     DC    PL5'0'
STUSTA    DS    PL2
RESULT    DS    CL5
ZEROS     DC    CL2'00'
SAVADD    DC    PL3'0'
SAVLF     DC    PL3'0'
NUMHRS    DC    PL1'9'
```

```
NUMDAY    DC     PL1'5'
ACCUM     DS     CL15
SPEC      DS     CL18
*****
*
***ERROR MESSAGE CONSTANTS
*
*****
BADNUMB   DC     C'@@@@@@@@@INVALID NUMERIC FIELD IN THE DECK@@@@@@@@'
INVCHAR   DC     C'@@@@@@@@@@INVALID ALPHABETIC FIELD IN THIS DECK@@@@@@@@@'
TOOFEW    DC     C'LESS THAN 5 DATA CARDS FOR THIS ROOM'
WARNING   DC     C'@@@@@@@@@@DATA DECK FOR THIS ROOM MISPUNCHED OR NOT IN O*
               RDER.  CHECK COLUMNS 1 THRU 5 AND 10 ON ALL FIVE CARDS F*
               OR CORRECTNESS@@@@@@@@@@'
*****
*
***EMPTY ROOM TIME TABLE
*
*****
TIME      DC     C'1600'
          DC     C'1500'
          DC     C'1400'
          DC     C'1300'
          DC     C'1200'
          DC     C'1100'
          DC     C'1000'
          DC     C'0900'
          DC     C'0800'
*****
*
***CONSTANTS USED IN PRINTING SCHEDULE BOX
*
*****
HOUR      DC     C'0          0800          0900          1000          1100  *
                     1200          1300          1400          1500          160*
                  0     DAILY LF
MARK      DC     C'     |     |     |     |     |     |     |     |     |     *
                    |     |     |     |     |     |     |     |     |     |  *
                    |     |     |     |     |     |     |     |     |     |  *
LINE      DC     C'+    ------------------------------------------------------*
                  ------------------------------------------------------------*
MON       DC     C'     MON |     |     |     |     |     |     |     |     |  *
                    |     |     |     |     |     |     |     |     |     |  *
                    |     |     |     |     |     |     |     |     |     |  *
TUE       DC     C'     TUE |     |     |     |     |     |     |     |     |  *
                    |     |     |     |     |     |     |     |     |     |  *
                    |     |     |     |     |     |     |     |     |     |  *
```

```
WED      DC    C'   WED |         |         |         |         |         *
                        |         |         |         |         |         *
                        |         |         |         |         |
THU      DC    C'   THU |         |         |         |         |         *
                        |         |         |         |         |         *
                        |         |         |         |         |
FRI      DC    C'   FRI |         |         |         |         |         *
                        |         |         |         |         |         *
                        |         |         |         |         |
QTR      DC    C'0      QUARTERLY LF=                                     *
                                                                          *
                                                                          *
*****
*
***CONSTANTS FOR PRINTING PAGE HEADING EXAMPLE
*
*****
EX3      DC    C'+                                                  # OF STUDE*
               NTS-----25  0.50-----LOAD FACTOR                           *
                                                                          *
EX4      DC    C'+                                          STUDENTS CIRRICU*
               LUM----CS   CS------PROFESSORS DEPT.                       *
                                                                          *
INPT     DCB   DDNAME=INPUTAPE,DSORG=PS,MACRF=(GT),LRECL=80,BLKSIZE=960*
               ,RECFM=FB,EODAD=MYEOF
WTPE1    DCB   DDNAME=TAPLOADF,DSORG=PS,MACRF=(PM),LRECL=15,BLKSIZE=450*
               ,RECFM=FB
WTPE2    DCB   DDNAME=TAPEMPTY,DSORG=PS,MACRF=(PM),LRECL=18,BLKSIZE=180*
               0,RECFM=FB
OUTPT    DCB   DDNAME=MYOUT,DSORG=PS,MACRF=(PM),BLKSIZE=133,RECFM=FA
         END

//GO.SYSUDUMP DD SYSOUT=A
//GO.MYOUT DD SYSOUT=A
//GO.TAPEMPTY DD DSNAME=ARN.USEE,UNIT=2400,VOLUME=SER=NPS156,DISP=(NEW,
//         KEEP),LABEL=(1,SL)
//GO.TAPLOADF DD DSNAME=ARN.LAME,UNIT=2400,VOLUME=SER=NPS164,DISP=(OLD,
//         KEEP),LABEL=(1,SL)
//GO.INPUTAPE DD DSNAME=ARN.USAG,UNIT=2400,VOLUME=SER=NPS149,DISP=(OLD,
//         KEEP),LABEL=(1,SL)
```

```
//    EXEC ASMALG,REGION.GO=100K,TIME.GO=2
//ASM.SYSIN DD *
*********************************************************************
*********************************************************************
****                                                             ****
**** THIS PROGRAM ACCEPTS EMPTY ROOM DATA FROM TAPE AND PRINTS IT  ****
**** IN EDITED FORMAT                                            ****
****                                                             ****
*********************************************************************
*********************************************************************
          PRINT NOGEN
NAME      CSECT
          USING     *,15
          SAVE      (14,12),T,*
          LR        12,13
          CNOP      0,4
          BAL       13,*+76
          DROP      15
          USING     *,13
          DS        18F
          ST        13,8(12)
          ST        12,4(13)
*****
*
***INITIALIZE PROGRAM AND READ A RECORD
*
*****
          OPEN   (IN,(INPUT),OUT,(OUTPUT))
          MVI    SWITCH,X'00'          RESET LABORATORY HEADING SWITCH
          LA     2,INAREA              R2 HOLD ADDR OF TAPE INPUT AREA
          LA     3,STORE               R3 HOLDS ADDR OF RECORD STORAGE AREA
          LA     11,LOFO               R11 HOLDS ADDR OF OUTPUT AREA
          LA     12,1                  R12=1
          LA     4,45                  R4 IS LOOP COUNTER FOR BCT
          MVI    STORE,C' '            CLEAR STORAGE AREA
          MVC    STORE+1(17),STORE
          MVI    INAREA,C' '           CLEAR INPUT AREA
          MVC    INAREA+1(17),INAREA
          GET    IN,INAREA             READ RECORD FROM TAPE
          MVI    LOFO,C' '             CLEAR OUTPUT AREA
          MVC    LOFO+1(25),LOFO
*****
*
***PRINT PAGE HEADINGS AND SUBHEADINGS
*
*****
TITLE1    PUT    OUT,TITLE             PRINT PAGE HEADING
          MVI    LOFO,C'0'             MOVE DOUBLE SPACE CHAR TO OUTAREA
```

```
         MVC   5(4,11),=C'ROOM'     MOVE PART OF SUBHEADING TO OUTAREA
         MVC   14(8,11),=C'STATIONS'   MOVE REST OF SUBHEADING TO OUTAR
         PUT   OUT,LOFO             PRINT SUBHEADINGS
         MVI   LOFO,C' '            CLEAR OUTPUT AREA
         MVC   LOFO+1(25),LOFO
*****
*
***THIS ROUTINE INSERTS "LABORATORY" INTO THE PAGE HEADING CONSTANT
***ONCE AFTER ALL CLASSROOM DATA HAS BEEN PRINTED
*
*****
BEGIN    CLI   SWITCH,X'01'         CHECK HOUR SWITCH SETTING
         BC    8,HOUR               IF SWITCH IS RESET BRANCH
         CLI   10(2),X'D3'          OTHERWISE CHECK FOR "L" IN COL 11
         BC    8,LAB                BRANCH IF "L" FOUND
HOUR     CLC   1(4,2),1(3)          CHECKING TO SEE IF HOUR HAS CHANGED
         BC    7,NEWHR              IF IT DID BRANCH TO NEW HOUR ROUT.
*****
*
***PRINT ROOM NUMBER AND SIZE, STORE RECORD JUST FINSHED, AND READ
***NEXT RECORD
*
*****
HERE     MVC   5(5,11),5(2)         MOVE ROOM NUMBER TO OUTAREA
         MVC   14(3,11),11(2)       MOVE NO. OF STUDENT STA. TO OUTAREA
         PUT   OUT,LOFO             PRINT LINE OF OUTPUT
         MVI   LOFO,C' '            CLEAR OUTPUT AREA
         MVC   LOFO+1(25),LOFO
         MVC   STORE,INAREA         STORE RECORD JUST EDITED & PRINTED
         GET   IN,INAREA            READ ANOTHER RECORD FROM TAPE
         BCT   4,BEGIN              BRANCH IF < 45 LINES PRINTED
         LA    4,45                 REINITIALIZE LOOP COUNTER
         BC    15,TITLE1            BRANCH TO PRINT NEW TITLE
*****
*
***TRANSLATE DAY CODE USING "MON" TABLE WHEN A CHANGE IN HOUR OCCURS
***AND PRINT DAY AND HOUR
*
*****
NEWHR    SR    6,6                  ZERO R6
         SR    9,9                  ZERO R9
         LA    10,MON-9             LOAD ADDR OF DAY TABLE IN R10
         LA    7,9                  R7=9 (TABLE ENTRY LENGTH)
         NI    0(2),X'0F'           STRIP "F" OFF DAY NUMBER
         IC    9,0(2)               INSERT STRIPPED CHAR IN R9
         MR    6,9                  MULT TO CORRCET TABLE ENTRY
         AR    7,10                 ADD TO BEGIN ADDR TO GET CORRECT ADD
         MVC   3(9,11),0(7)         MOVE RESULT DAY TO OUTAREA
```

```
          MVC   12(4,11),1(2)        MOVE HOUR TO OUTAREA
          MVI   0(11),C'0'           MOVE DOUBLE SPACE CHAR TO OUTAREA
          PUT   OUT,LOFO             PRINT LINE OF OUTPUT
          SR    4,12                 DECREMENT BCT LOOP COUNTER
          MVI   LOFO,C' '            CLEAR OUTPUT AREA
          MVC   LOFO+1(25),LOFO
          BC    15,HERE              BRANCH TO HERE
LAB       MVC   TITLE+15(11),=C'LABORATORIES'  CHANGE PAGE HEADING
          MVI   SWITCH,X'01'         SET LABORATORY HEADING SWITCH
          LA    4,45                 REINITIALIZE LOOP COUNTER
          BC    15,TITLE1            BRANCH TO TITLE1
MYEOF     CLOSE (IN,,OUT)
          L     13,4(13)
          RETURN    (14,12),T
*****
*
***LITERAL EXPRESSIONS
*
*****
          LTORG
*****
*
***PROGRAM STORAGE AREAS AND CONSTANTS
*
*****
TITLE     DC    C'1LIST OF EMPTY CLASSROOMS '
INAREA    DS    CL18
STORE     DS    CL18
LOFO      DS    CL26
SWITCH    DS    CL1
*****
*
***TABLE FOR DAY CODE CONVERSION
*
*****
MON       DC    C'MONDAY    '
          DC    C'TUESDAY   '
          DC    C'WEDNESDAY '
          DC    C'THURSDAY  '
          DC    C'FRIDAY    '
IN        DCB   DDNAME=ARNOLDIN,DSORG=PS,MACRF=(GM),LRECL=18,BLKSIZE=180*
               0,RECFM=FB,FCDAD=MYECF,EROPT=ACC
OUT       DCB   DDNAME=ARNOLOUT,DSORG=PS,MACRF=(PM),BLKSIZE=26,RECFM=FA,*
               EROPT=ACC
          END

//GO.SYSUDUMP DD SYSOUT=A
//GO.ARNOLOUT DD SYSOUT=A
```

```
//GO.ARNOLDIN DD DSNAME=ARN.SCRT,UNIT=2400,VOLUME=SER=NPS164,DISP=(OLD,
//            KEEP),LABEL=(1,SL)
```

```
//   EXEC ASMALG,REGION.GO=100K,TIME.GO=2
//ASM.SYSIN DD *
*********************************************************************
*********************************************************************
****                                                             ****
**** THIS PROGRAM ACCEPTS HISTORICAL LOAD FACTOR DATA FROM TAPE  ****
**** AND PRINTS IT IN EDITED FORMAT                              ****
****                                                             ****
*********************************************************************
*********************************************************************
         PRINT NOGEN
NAME     CSECT
         USING     *,15
         SAVE      (14,12),T,*
         LR        12,13
         CNOP      0,4
         BAL       13,*+76
         DROP      15
         USING     *,13
         DS        18F
         ST        13,8(12)
         ST        12,4(13)
         OPEN  (WTPE1,,OUT,(OUTPUT))
*****
*
***INITIALIZE PROGRAM, READ A RECORD, AND PRINT PAGE HEADING
*
*****
         LA    2,LOFC              R2 HOLDS ADDR OF PRINTER OUTPUT AREA
         LA    3,INAREA            R3 HOLDS ADDR OF TAPE INPUT AREA
         LA    4,30                R4 IS LOOP COUNTER FOR BCT
         MVI   LOFC,C' '           CLEAR OUTPUT AREA
         MVC   LOFC+1(45),LOFC
         MVI   INAREA,C' '         CLEAR INPUT AREA
         MVC   INAREA+1(14),INAREA
         GET   WTPE1,INAREA        READ RECORD FROM TAPE
RET1     MVC   TITLE+41(1),10(3)   MOVE QUARTER NO. TO TITLE TO PRINT
         MVI   TITLE+43,C''''      INSERT AN APOSTERPHE
         MVC   TITLE+44(2),11(3)   MOVE LAST 2 DIGITS OF YEAR TO TITLE
         PUT   OUT,TITLE           PRINT PAGE HEADING (TITLE)
*****
*
***MOVE ROOM NUMBER, LOAD FACTOR, AND USE (CLASSROOM OR LABRATORY)
***TO OUTPUT AREA AND PRINT AND THEN READ ANOTHER RECORD
*
*****
RET2     MVI   LOFC,C'0'           MOVE DOUBLE SPACE CHAR TO OUT AREA
         MVC   5(5,2),0(3)         MOVE ROOM NO. TO OUT AREA
```

```
         MVC   12(4,2),6(3)          MOVE LOAD FACTOR TO OUT AREA
         CLI   5(3),X'C3'            CHECK COLUMN 6 FOR "C" (CLASSROOM)
         BC    8,*+14                BRANCH AROUND NEXT 2 INST IF "C"
         MVC   19(9,2),=C'LABORATORY'  IF NOT "C" THEN MUST BE "L"
         BC    15,*+10               BRANCH AROUND NEXT INSTRUCTION
         MVC   19(9,2),=C'CLASSROOM'   MOVE CLASSROOM TO OUTAREA IF C
         PUT   OUT,LOFO              PRINT LINE OF OUTPUT
         MVI   LOFO,C' '             CLEAR OUTPUT AREA
         MVC   LOFO+1(45),LOFO
         GET   WTPE1,INAREA          READ ANOTHER RECORD FROM TAPE
         BCT   4,RET2                BRANCH TO RET2 IF < 30 LINES PRINTED
         LA    4,30                  REINITIALIZE LOOP COUNTER
         BC    15,RET1               BRANCH IF 30 LINES PRINTED FOR TITLE
MYEOF    CLOSE (WTPE1,,OUT)
         L     13,4(13)
         RETURN    (14,12),T
*****
*
***LITERAL EXPRESSIONS
*
*****
         LTORG
*****
*
***PROGRAM STORAGE AREAS (INPUT AND OUTPUT) AND TITLE CONSTANT
*
*****
GETA     DS    CL80
LOFO     DS    CL46
INAREA   DS    CL15
TITLE    DC    C'1HISTORICAL LOAD FACTOR DATA FOR QUARTER      '
WTPE1    DCB   DDNAME=PUTLOADF,DSORG=PS,MACRF=(GM),LRECL=15,BLKSIZE=450*
               ,RECFM=FB,EODAD=MYEOF
OUT      DCB   DDNAME=ARNOLOUT,DSORG=PS,MACRF=(PM),BLKSIZE=46,RECFM=FA
         END

//GO.SYSUDUMP DD SYSOUT=A
//GO.ARNOLOUT DD SYSOUT=A
//GO.PUTLOADF DD DSNAME=ARN.LAME,UNIT=2400,VOLUME=SER=NPS149,DISP=(OLD,
//             KEEP),LABEL=(4,SL)
```

```
//    EXEC ASMALG
//ASM.SYSIN DD *
*********************************************************************
*********************************************************************
****                                                             ****
**** THIS PROGRAM UPDATES THE MASTER FILE TAPE FOR THE BUILDING  ****
**** AND SPACES DATA BANK AND PROVIDES A PRINTED RECORD OF EACH  ****
**** CHANGE                                                      ****
****                                                             ****
*********************************************************************
*********************************************************************
          PRINT NOGEN
NAME      CSECT
          USING     *,15
          SAVE      (14,12),T,*
          LR        12,13
          CNOP      0,4
          BAL       13,*+76
          DROP      15
          USING     *,13
          DS        18F
          ST        13,8(12)
          ST        12,4(13)
*****
*
***PRINT HEADINGS AND INITIAL PROGRAM
*
*****
          OPEN  (INPT1,,INPT2,,OUTT,(OUTPUT),OUTP,(OUTPUT))
          PUT   OUTP,HEAD              PRINT HEADINGS
          PUT   OUTP,LEGEND
          MVI   LOFO,C' '              CLEAR AN OUTPUT AREA
          MVC   LOFO+1(79),LOFO
          MVI   LOFO1,C' '             CLEAR ANOTHER OUTPUT AREA
          MVC   LOFO1+1(80),LOFO1
          MVI   LOFO1,C'0'             DOUBLE SPACE CHARACTER
          PUT   OUTP,LOFO1             DOUBLE SPACE ON PRINTER
          LA    10,LOFO1               R10 HOLDS ADDR OF PRINTER OUTAREA
          LA    9,LOFO                 R9 HOLDS ADDR OF TAPE OUTAREA
          LA    2,INAREA1              R2 HOLDS ADDR OF UPDATE DECK INAREA
          LA    3,INAREA2              R3 HOLDS ADDR OF OLD MASTER INAREA
*****
*
***CHECK FIRST CARD TO INSURE IT IS AN "UPDATE" CARD
*
*****
          GET   INPT1,(2)              READ A CARD FROM THE UPDATE DECK
          LR    2,1                    PASS ITS ADDR TO R2 IN R1
```

```
         CLC   9(6,2),=C'UPDATE'   IS IT THE UPDATE CARD AS REQUIRED
         BC    7,NOUPCRD           BRANCH IF 1ST CARD IS NOT UPDATE CRD
         CLI   24(2),C' '          IS 1ST CHAR BLANK IN NAME FIELD
         BC    8,NOUPCRD           BRANCH IF 1ST CHAR IS BLANK
         MVC   STORE,0(2)          MOVE CORRECT UPDATE TO STORAGE AREA
*****
*
***READ RECORDS FROM MASTER AND TRANSACTION FILES AND DETERMINE ACTION
*
*****
BOTHREC  GET   INPT1,(2)           READ CARD FROM UPDATE DECK
         LR    2,1                 PASS ITS ADDR TO R2 IN R1
OLDREC   GET   INPT2,(3)           READ RECORD FROM MASTER FILE
         LR    3,1                 PASS ITS ADDR TO R3 IN R1
CHREC    CLC   9(6,2),=C'UPDATE'   CHECKING FOR LAST UPDATE CARD IN DEC
         BC    8,LUPCD             BRANCH TO LAST UPDATE CARD ROUTINE
         CLC   9(6,3),=C'UPDATE'   LOCKING FOR LAST MASTER FILE RECORD
         BC    8,LMASCD            BRANCH TO LAST MASTER CARD ROUT IF =
         CLC   0(8,2),0(3)         COMPARE IDENTIFIER ON MAST & UPDATE
         BC    4,INSERT            LO COMPARE=RECORD TO BE INSERTED
         BC    8,UPDEL             EQUAL COMPARE=DELETE OR UPDATE
         MVC   0(80,9),0(3)        MOVE UNCHANGED RECORD TO OUTPUT AREA
         PUT   OUTT,LOFO           PUT UNCHANGED RECORD ON NEW MASTER
         MVI   LOFC,C' '           CLEAR OUTPUT AREA
         MVC   LOFC+1(79),LOFC
         BC    15,OLDREC           BRANCH TO GET ANOTHER OLD RECORD
*****
*
***INSERT RECORD TO BE ADDED TO MASTER FILE AND PRINT COPY OF IT
*
*****
INSERT   CLI   79(2),C'I'          CHECK FOR LETTER "I" IN COLUMN 80
         BC    8,OKAY1             BRANCH IF "I" FOUND
         MVC   1(80,10),0(2)       MOVE BAD RECORD TO PRINT OUTAREA
         PUT   OUTP,LOFO1          PRINT BAD RECORD
         MVI   LOFC1,C' '          CLEAR PRINT OUTAREA
         MVC   LOFC1+1(80),LOFO1
         MVI   LOFC1,C'0'          INSERT DOUBLE SPACE CHARACTER
         PUT   OUTP,ERROR          PRINT ERROR MESSAGE
         BC    15,MORE
OKAY1    MVC   1(80,10),0(2)       MOVE INSERT RECORD TO PRINT OUTAREA
         PUT   OUTP,LOFO1          PRINT RECORD TO BE INSERTED
         MVI   LOFC1,C' '          CLEAR OUTPUT AREA
         MVC   LOFC1+1(80),LOFC1
         MVI   LOFC1,C'0'          INSERT DOUBLE SPACE CHARACTER
         MVC   0(80,9),0(2)        MOVE INSERT RECORD TO TAPE OUTAREA
         MVI   79(9),C' '          REMOVE "I" FROM RECORD BEFORE TAPE
         PUT   OUTT,LOFO           INSERT RECORD ON NEW MASTER
```

```
         MVI   LCFC,C' '              CLEAR TAPE OUTAREA
         MVC   LCFC+1(79),LCFC
MORE     GET   INPT1,(2)              READ ANOTHER RECORD FROM UPDATE DECK
         LR    2,1                    PASS ADDR TO R2 IN R1
         BC    15,CHREC               BRANCH TO INITIAL COMPARE ROUTINE
*****
*
***DETERMINE IF RECORD IS TO BE UPDATED OR DELETED AND DELETE
***IF REQUIRED.  ALSO PRINT COPY OF DELETED RECORD
*
*****
UPDEL    CLI   79(2),C'D'             CHECK FOR LETTER "D" IN COLUMN 80
         BC    7,UPDATE               BRANCH IF NOT FOUND TO UPDATE ROUT.
         MVI   79(3),C'D'             INSERT "D" IN COL 80 OF DELETE REC.
         MVC   1(80,10),0(3)          MOVE DELETE RECORD TO PRINT OUTAREA
         PUT   OUTP,LOF01             PRINT DELETED RECORD
         MVI   LCFC1,C' '             CLEAR PRINTER OUTAREA
         MVC   LCFC1+1(80),LCFC1
         MVI   LOFC1,C'0'             INSERT DOUBLE SPACE CHARACTER
         BC    15,BGTHREC             BRANCH TO GET MORE RECORDS
*****
*
***UPDATE RECORD AND PRINT COPY BEFORE AND AFTER UPDATE
*
*****
UPDATE   CLI   79(2),C'U'             CHECK FOR LETTER "U" IN COLUMN 80
         BC    8,OKAY2                BRANCH IF "U" IS FOUND
         MVC   1(80,10),0(2)          MOVE BAD RECORD TO PRINT OUTAREA
         PUT   OUTP,LOF01             PRINT BAD RECORD
         MVI   LCFC1,C' '             CLEAR PRINT OUTAREA
         MVC   LCFC1+1(80),LCFC1
         MVI   LCFC1,C'0'             INSERT DOUBLE SPACE CHARACTER
         PUT   OUTP,ERROR             PRINT ERROR MESSAGE
         MVC   0(80,9),INAREA2        MOVE OLD RECORD TO TAPE OUTAREA
         PUT   OUTT,LOF0              WRITE RECORD ON NEW MASTER
         MVI   LCFC,C' '              CLEAR OUTPUT AREA
         MVC   LCFC+1(79),LCFC
         BC    15,BGTHREC             GET MORE RECORDS
OKAY2    MVC   1(80,10),0(3)          MOVE UPDATE RECORD FROM MASTER
         PUT   OUTP,LOF01             PRINT COPY OF RECORD TO BE UPDATED
         MVI   LCF01,C' '             CLEAR PRINTER OUTAREA
         MVC   LCFC1+1(80),LCFC1
         LA    2,8(2)                 R2 POINTS TO 1ST POSSIBLE UPDATE COL
         LA    3,8(3)                 R3 POINTS TO 1ST POSSIBLE UPDATE COL
         LA    4,55                   R4 IS BCT LOOP COUNTER
AGAIN    CLI   0(2),C' '              LOOKING FOR BEGINNING OF UPDAT FIELD
         BC    7,FOUND                BRANCH IF NONBLANK FOUND
         LA    2,1(2)                 R2 POINTS TO NEXT COLUMN
```

```
                LA      3,1(3)                  R3 POINTS TO NEXT COLUMN
                BCT     4,AGAIN                 BRANCH IF R2 NE ZERO
                BC      15,DONE                 BRANCH WHEN ALL COLUMNS ARE CHECKED
FOUND           LR      5,2                     NONBLANK FOUND (SAVE R2 ADDR IN R5)
                LA      5,1(5)                  R5 POINTS TO NEXT COLUMN TO BE CHECK
RET1            CLI     0(5),C' '               LOOKING FOR END OF UPDATE FIELD
                BC      8,FIELD                 BRANCH IF END FOUND
                LA      5,1(5)                  R5 POINTS TO NEXT COLUMN TO CHECK
                BCT     4,RET1                  BRANCH IF R2 NE ZERO
                BC      15,DONE                 BRANCH WHEN ALL COLUMNS CHECKED
FIELD           SR      5,2                     FIND FIELD LENGTH (R5)
                LA      6,1                     R6=1
                SR      5,6                     R5 NOW HOLDS LENGTH FOR EXECUTE INST
                EX      5,MOVE                  MOVE UPDATE FIELD TO OLD RECORD
                AR      5,6                     R5 RIGHT AGAIN
                AR      2,5                     R2 POINTS TO NEXT COL ON UPDATE REC
                AR      3,5                     R3 POINTS TO NEXT COL ON OLD REC
                BCT     4,AGAIN                 BRANCH IF NOT AT END OF DATA FIELDS
DONE            LA      2,INAREA1               RESET R2 TO ADDR OF UPDATE RECORD
                LA      3,INAREA2               RESET R3 TO ADDR OF OLD RECORD
                MVC     0(80,9),0(3)            MOVE UPDATED RECORD TO TAPE OUTAREA
                PUT     OUTT,LOFO               WRITE UPDATED RECORD ON NEW MASTER
                MVI     LOFC,C' '               CLEAR OUTPUT AREA
                MVC     LOFC+1(79),LOFC
                MVC     1(80,10),0(3)           MOVE UPDATED RECORD TO PRINT OUTAREA
                MVI     80(10),C'U'             INSERT LETTER "U" IN RECORD TO PRINT
                PUT     OUTP,LOFC1              PRINT UPDATED RECORD
                MVI     LOFC1,C' '              CLEAR PRINTER OUTAREA
                MVC     LOFC1+1(80),LOFC1
                MVI     LOFC1,C'0'              INSERT DOUBLE SPACE CHARACTER
                BC      15,BCTHREC              BRANCH TO GET MORE RECORDS
*****
*
***COMPLETE MASTER FILE TRANSFER AFTER TRANSACTION FILE COMPLETE
*
*****
LUPCD           GET     INPT2,(3)               READ RECORD FROM OLD MASTER FILE
                LR      3,1                     PASS ADDR OF RECORD TO R3 IN R1
                CLC     9(6,3),=C'UPDATE'       IS THIS LAST RECORD FROM OLD MASTER
                BC      8,NOW                   BRANCH IF LAST RECORD
                MVC     0(80,9),0(3)            MOVE RECORD TO TAPE OUTAREA
                PUT     OUTT,LOFO               PUT RECORD ON NEW MASTER FILE
                MVI     LOFC,C' '               CLEAR TAPE OUTAREA
                MVC     LOFC+1(79),LOFC
                BC      15,LUPCD                BRANCH AND DO IT AGAIN TIL LAST CARD


*****
```

```
*
***COMPLETE TRANSACTION FILE AFTER MASTER FILE COMPLETED
*
*****
LMASCD   GET   INPT1,(2)          READ RECORD FROM UPDATE FILE
         LR    2,1                PASS ADDR OF RECORD TO R2 IN R1
         CLC   9(6,2),=C'UPDATE'  IS THIS LAST RECORD FROM UPDATE FILE
         BC    7,INSERT1          IF NOT BRANCH TO INSERT ROUTINE
*****
*
***COMPUTE NEW UPDATE NUMBER
*
*****
NOW      MVC   0(80,2),STORE      RETRIEVE 1ST UPDATE CARD FROM STORE
         PACK  UPNUM,17(2,3)      PACK UPDATE NO. FROM MASTER FILE
         AP    UPNUM,ONE          INCREMENT UPDATE NUMBER BY ONE
         UNPK  RESULT,UPNUM       UNPACK RESULTANT SUM
         OI    RESULT+2,X'F0'     RESTORE PROPER ZONE HALF TO NUMBER
         MVC   17(2,2),RESULT+1   MOVE NUMBER TO NEW UPDATE RECORD
         MVI   16(2),C'#'         INSERT "#" IN COL PRECEDING NEW NO.
         MVC   0(80,9),0(2)       MOVE UPDATE RECORD TO TAPE OUTAREA
         PUT   OUTT,LOF0          WRITE UPDATE RECORD ON TAPE
         MVC   1(80,10),0(2)      MOVE UPDATE RECORD TO PRINT OUTAREA
         PUT   OUTP,LOF01         PRINT UPDATE RECORD
         BC    15,MYECF           BRANCH TO CLOSE ROUTINE
*****
*
***INSERT REMAINDER OF TRANSACTION FILE RECORDS AFTER MASTER FILE
***TRANSFER COMPLETE IF NECESSARY
*
*****
INSERT1  CLI   79(2),C'I'         CHECK FOR LETTER "I" IN COLUMN 80
         BC    8,OKAY3            BRANCH IF "I" FOUND
         MVC   1(80,10),0(2)      MOVE BAD RECORD TO PRINT OUTAREA
         PUT   OUTP,LOF01         PRINT BAD RECORD
         MVI   LOFC1,C' '         CLEAR PRINT OUTAREA
         MVC   LOFC1+1(80),LOFC1
         MVI   LOFC1,C'0'         INSERT DOUBLE SPACE CHARACTER
         PUT   OUTP,ERROR         PRINT ERROR MESSAGE
         BC    15,LMASCD          BRANCH TO READ NEXT TRANS RECORD
OKAY3    MVC   1(80,10),0(2)      MOVE INSERT RECORD TO PRINT OUTAREA
         PUT   OUTP,LOF01         PRINT RECORD TO BE INSERTED
         MVI   LOFC1,C' '         CLEAR OUTPUT AREA
         MVC   LOFC1+1(80),LOFC1
         MVI   LOFC1,C'0'         INSERT DOUBLE SPACE CHARACTER
         MVC   0(80,9),0(2)       MOVE INSERT RECORD TO TAPE OUTAREA
         MVI   79(9),C' '         REMOVE "I" FROM RECORD BEFORE TAPE
         PUT   OUTT,LOF0          INSERT RECORD ON NEW MASTER
```

```
         MVI   LCFC,C' '              CLEAR TAPE CUTAREA
         MVC   LCFC+1(79),LCFC
         BC    15,LMASCD              BRANCH AND CO IT AGAIN
*****
*
***THIS INSTRUCTICN USED IN CCNJUNCTICN WITH THE EXECUTE INSTRUCTION
***TO MOVE VARIABLE LENGTH FIELDS
*
*****
MOVE     MVC   0(0,3),0(2)            MOVE UPDATE FIELD TO OLD RECORD
NOUPCRD  PUT   OUTP,LOFO1              PRINT DOUBLE SPACE
         PUT   CUTP,CHEAT              PRINT ERROR MESSAGE
MYEOF    CLOSE (INPT1,,INPT2,,CUTT,,CUTP)
         L     13,4(13)
         RETURN    (14,12),T
*****
*
***LITERAL EXPRESSIONS
*
*****
         LTORG
*****
*
***PROGRAM STORAGE AREAS AND CONSTANTS
*
*****
UPNUM    DS    PL2
ONE      DC    PL1'1'
RESULT   DS    CL3
STORE    DS    CL80
INAREA1  DS    CL80                   RECORD FROM BATCHED TAPE
INAREA2  DS    CL80                   RECORD FROM MASTER TAPE
LOFO     DS    CL80                   OUTPUT AREA
LOFO1    DS    CL81
HEAD     DC    C'1THE FOLLOWING RECORDS WERE ALTERED BY BUILDING && SPA*
               CES MASTER FILE UPDATE    '
CHEAT    DC    C'0****INITIAL UPDATE CARD MISSING OR IMPROPERLY FORMATE*
               D.  CORRECT AND RESUBMIT***'
LEGEND   DC    C'0    D=RECORD DELETED    I=RECORD INSERTED    U=RECORD U*
               PDATED                 '
ERROR    DC    C'0*******ERROR:CHECK COLUMNS 1-8 && COLUMN 80 OF ABOVE *
               CARD FOR CORRECT DATA*******'
INPT1    DCB   DDNAME=ARNINONE,DSORG=PS,MACRF=(GT),BLKSIZE=80,RECFM=F,E*
               ODAD=MYEOF
INPT2    DCB   DDNAME=ARNINTWO,DSORG=PS,MACRF=(GT),LRECL=80,BLKSIZE=960*
               ,RECFM=FB,EODAD=MYEOF
OUTT     DCB   DDNAME=ARNOUTTP,DSORG=PS,MACRF=(PM),LRECL=80,BLKSIZE=960*
               ,RECFM=FB
```

```
OUTP      DCB    DDNAME=ARNOUTPT,DSORG=PS,MACRF=(PM),BLKSIZE=81,RECFM=FA
          ENC

//GO.SYSUDUMP DD SYSOUT=A
//GO.ARNOUTPT DD SYSOUT=A
//GO.ARNINTWO DD DSNAME=ARN.BLDG,UNIT=2400,VOLUME=SER=NPS149,DISP=(OLD,
//         KEEP),LABEL=(1,SL)
//GO.ARNOUTTP DD DSNAME=ARN.BLDF,UNIT=2400,VOLUME=SER=NPS156,DISP=(NEW,
//         KEEP),LABEL=(1,SL)
//GO.ARNINDAE DD *
```

```
//    EXEC ASMALG,REGION.GO=100K,TIME.GO=2
//ASM.SYSIN DD *
*********************************************************************
*********************************************************************
****                                                             ****
**** THIS PROGRAM READS A RECORD (CARD) FROM THE CARD READER AND ****
**** WRITES IT ON TAPE                                           ****
****                                                             ****
*********************************************************************
*********************************************************************
          PRINT NOGEN
NAME      CSECT
          USING     *,15
          SAVE      (14,12),T,*
          LR        12,13
          CNOP      0,4
          BAL       13,*+76
          DROP      15
          USING     *,13
          DS        18F
          ST        13,8(12)
          ST        12,4(13)
*****
*
***INITIALIZE PROGRAM, READ A RECORD, AND WRITE IT ON TAPE
*
*****
          OPEN   (IN,(INPUT),LDTP,(OUTPUT))
READ      GET    IN,INPAREA          READ RECORD FROM CARD READER
          MVC    OUTAREA,INPAREA     MOVE RECORD TO OUTPUT AREA
          PUT    LDTP,OUTAREA        WRITE RECORD ON TAPE
          BC     15,READ             BRANCH TO READ NEXT RECORD
*****
*
***STORAGE AREAS FOR INPUT AND OUTPUT
*
*****
INPAREA   DS     CL80
OUTAREA   DS     CL80
MYEOF     CLOSE (IN,,LDTP)
          L      13,4(13)
          RETURN    (14,12),T
IN        DCB    DDNAME=ARNOLDIN,DSORG=PS,MACRF=(GM),BLKSIZE=80,RECFM=F,E*
                 ODAD=MYEOF
LDTP      DCB    DDNAME=ARNDTAPE,DSORG=PS,MACRF=(PM),LRECL=80,BLKSIZE=960*
                 ,RECFM=FB,EODAD=MYEOF
          LTORG
          END
```

```
//GO.SYSUDUMP DD SYSOUT=A
//GO.ARNDTAPE DD DSNAME=ARN.BLDG,UNIT=2400,VOLUME=SER=NPS149,DISP=(NEW,
//         KEEP,DELETE),LABEL=(1,SL)
//GO.ARNCLDIN DD *
```

BIBLIOGRAPHY

1. Chapin, N., 360 Programming in Assembly Language, McGraw-Hill Book Company, 1968.

2. International Business Machine Corporation, Systems Development Division, Poughkeepsie, New York, Concepts and Terminology for Programmers, by R. W. Engles, October, 1967.

3. Lochridge, R. K., A Proposal: Naval Postgraduate School Management Information System, Naval Postgraduate School, December, 1968.

4. NPGS Public Works Department, Building and Space Locations and Assignments, Naval Postgraduate School, December, 1955.

5. Postgraduate School Instruction 5000.1, Naval Postgraduate School Staff Instructions, October, 1966.

6. Postgraduate School Instruction 7100.1, Resources Management Systems Board, Establishment of, April, 1968.

7. Terborgh, G., The Automation Hysteria, Machinery and Allied Products Institute/Council for Technological Advancement, 1965.

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13. ABSTRACT

This document describes the design and development of a Building and Spaces Information System at the Naval Postgraduate School. The system was designed to be used by the Naval Postgraduate School facility resource managers as a decision making aid.

System analysis techniques were applied to the present facility resource decision system to determine its structure and information needs. Additional problem analysis was conducted to determine which of the needs could be incorporated into an information system. The intersection of the foregoing needs and the subsequent problem analysis determined the structure of the new system. The objective of the new system was to supply the managers with a centralized source of information with regard to existing facilities. A complete software package was designed, tested, and documented, but not implemented. An extensive users manual is provided to expedite implementation when it occurs.

14 KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
MANAGEMENT INFORMATION SYSTEM						
FACILITIES DATA BANK						
DATA BANK ORGANIZATION						
DATA BANK SEARCH						
SYSTEM ANALYSIS						
SYSTEM USERS MANUAL						

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